For producers of Sand nd Gravel, Crushed Stone, ment, Lime, Gypsum, and other nonmetallic minerals

JULY 1956

PIT and QUARRY

Table of Contents, Page 2

New and Old Plants of Ideal Cement Company at Portland, Colo., With Quarry in Background.

ANNUAL CEMENT MILLS ISSUE

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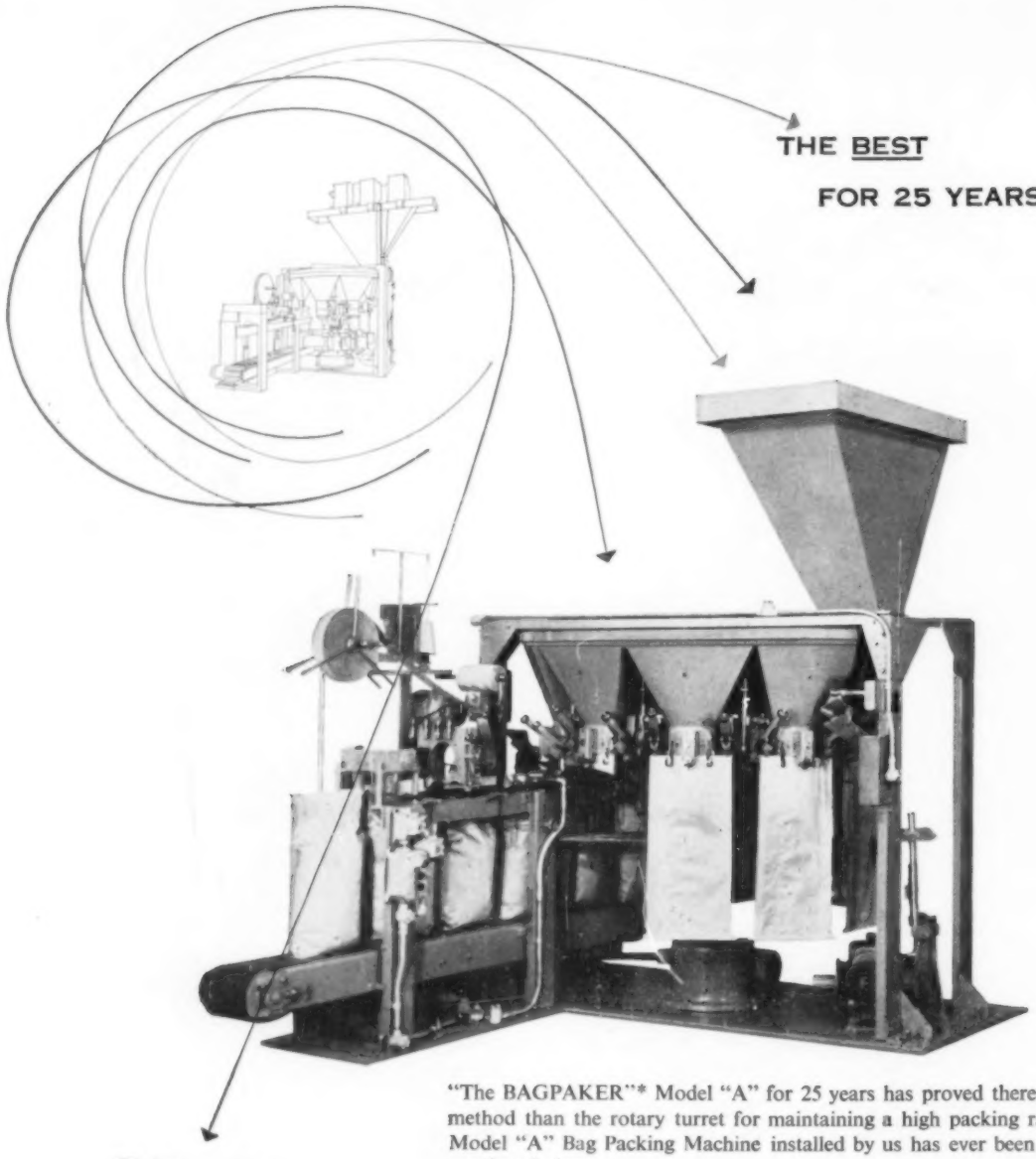

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pit and quarry

"THE BASIC MAGAZINE OF A BASIC INDUSTRY"

JULY 1956 Vol. 49 No. 1

IN THIS ISSUE:

NBP ABC BPA

EDITORIAL

The Highway Program 10

PLANT

Cement-Producing Capacity Soars in Southern California.... 75
Inland's New Edmonton Plant Most Northerly on This Continent 88
Whitehall Cement Completes First Stage of Ten-Year Program. 102
Penn-Dixie Increases Capacity 50 Percent at Petoskey..... 114
Lone Star Enlarges Bonner Springs Plant..... 126
Construction in Progress on Ideal's New Houston Plant..... 135
New Crystal Lake Plant of Consumers Company..... 174
Glacial Deposit Supplies Fines to Supplement River Gravel... 184

TECHNICAL

Rational Approaches to Cement Manufacture..... 70
Flame Control in Rotary Kilns..... 149

ASSOCIATIONS

Many Problems Discussed at N.A.L.I. Mid-Year Board Meeting. 186
First N.C.L.I. Summer Board Meeting..... 192
N.I.S.A. Plans for Progress at Its Annual Meeting..... 200

LEGISLATIVE

Washington News Letter 12

LABOR

Labor Developments 60

OTHER

Allis-Chalmers Unveils Pilot Model of ACL Traveling Grate Kiln. 188
Production and Value of Sand and Gravel in 1955..... 193
Dust Control at Bryan Rock & Sand Co..... 195

THE CONCRETE MANUFACTURER

EDITORIAL

How Well Do Your Employes Sell Your Business?..... 275

PLANT

Texas Industries open house in Dallas facility features growth..... 296

OPERATING

Modern Block Making Hampered by Antiquated Curing Equipment..... 311

ASSOCIATIONS

Prestressed Concrete Institute's annual meeting at Hollywood, Fla. 304

SAFETY

Safety Needs Promotion 334

OTHER

Disneyland Hotel Effects Achieved with Dimensional Block..... 291
Duplicating Nature . . . Texas Firm develops unusual effects..... 318
Production and Value of Ready Mixed Concrete in 1955 322
Faced Concrete Block 330

DEPARTMENTS

News of the Industry..... 23
New Machinery 50
Screenings 62
More Information Please 205
Personal Mention 209
Legal Decisions 211
Manufacturer's News 220
News of the Concrete Industries. 277
RX Ready-Mixed 286
New Machinery for the Concrete Industries 336
Index to Advertisers 374

Cover Picture

● On the front cover of this issue of PIT AND QUARRY is an aerial view of the quarry and two plants of the Ideal Cement Company at Portland, Colo. Shown are: in the left foreground, the 4400 bbl. per day wet process plant built in 1948 to supplement the older plant at right. In the background is the quarry and crushing and screening department with the belt conveyor which carries the prepared rock across the Arkansas River to both plants. This operation is symbolic of the present record expansion program of the cement industry in which many older plants are being augmented by the addition of completely new plants alongside them.

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other nonmetallic minerals.

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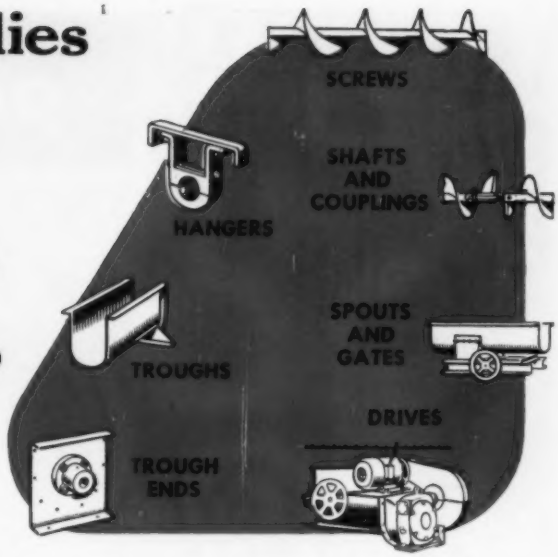
To subscribers: When requesting change of address, kindly send old as well as new address.

PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

How Link-Belt applies STANDARD or SPECIAL screw conveyors to meet your needs



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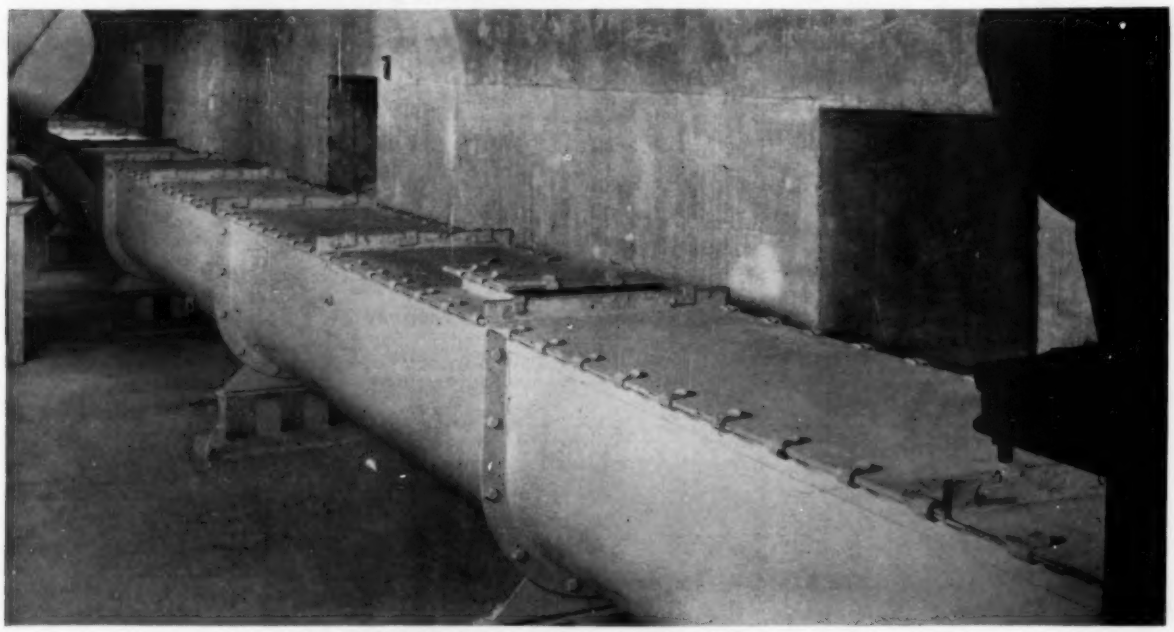

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Large mill hammers taken from the scrap pile needed a 2" to 2¼" build-up on length... required approximately 5 lbs. of Manganese and Stoody 100, combined. Smaller amounts of build-up and hard metal are required for subsequent maintenance.

DON'T THROW AWAY 9/10 OF EVERY MILL HAMMER

The Victorville Lime Rock Company on the Mojave Desert some 75 miles from Los Angeles operates a plant for the reduction of high grade limestone that is processed for a great many uses, from face powder base to roofing materials. For intermediate crushing the company uses Williams hammer mills —and as usual, hammer maintenance is a problem.

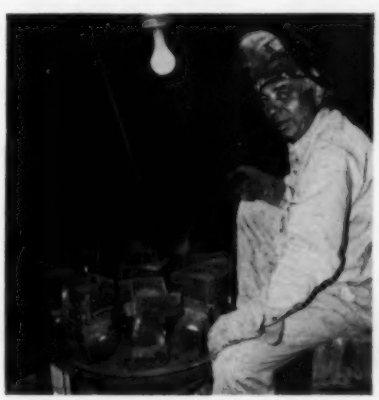
When a Stoody representative first called at this plant he found a scrap pile of worn hammers that had been discarded in favor of standard replacements. 9/10 of the hammer was still there but so severely worn as to have lost its efficiency. A set of nine new hammers represents an investment of approximately $200.00, so the huge scrap pile, to the hard-facing specialist, had all the appearance of a gold mine.

Tests were undertaken to determine the cost of rebuilding such hammers; a copper form was clamped around the worn end to fix the shape and the finish length. Using the semi-automatic welder running Stoody Nickel Manganese, the hammer was brought back to just under finish size, then peened and hard-faced on the end and corners with Stoody 100.

The original experimental rebuilding job proved successful and the procedure outlined has now been established as routine. New hammers measuring 4"x5"x10½" weigh 45 pounds. Between four and five pounds of Manganese and Stoody 100, a high-alloy, wear-resistant material, are required to bring a worn hammer back to size. The semi-automatic welding procedure is extremely fast, depositing three to six times as much weld metal as is possible by the manual method. After rebuilding, each hammer is carefully weighed and balanced for proper operation of the mill. As wear occurs in service, the semi-automatic welder is used to apply additional Stoody 100 free hand to maintain hammer size and shape.

By the method described hammer costs are enormously reduced and the mill's performance is considerably improved.

Further information on the hard-facing of all types of crushing equipment is provided by various pieces of Stoody literature. See your Stoody dealer (you will find him in the "Yellow Pages" of your phone book) or write direct.



George Stone, Maintenance Superintendent, shows turn-table fixture which speeds welding. Forms surrounding hammers are copper, establish hammer size and height of build-up.

Other hard-facing includes these quarry shovel teeth. Points are rebuilt with Stoody Manganese and hard-faced with Stoody 100. Note the copper mold which shapes the point.

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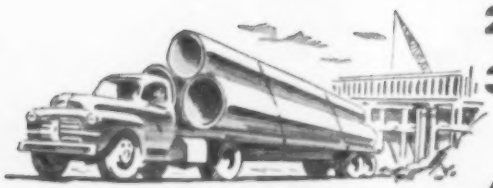

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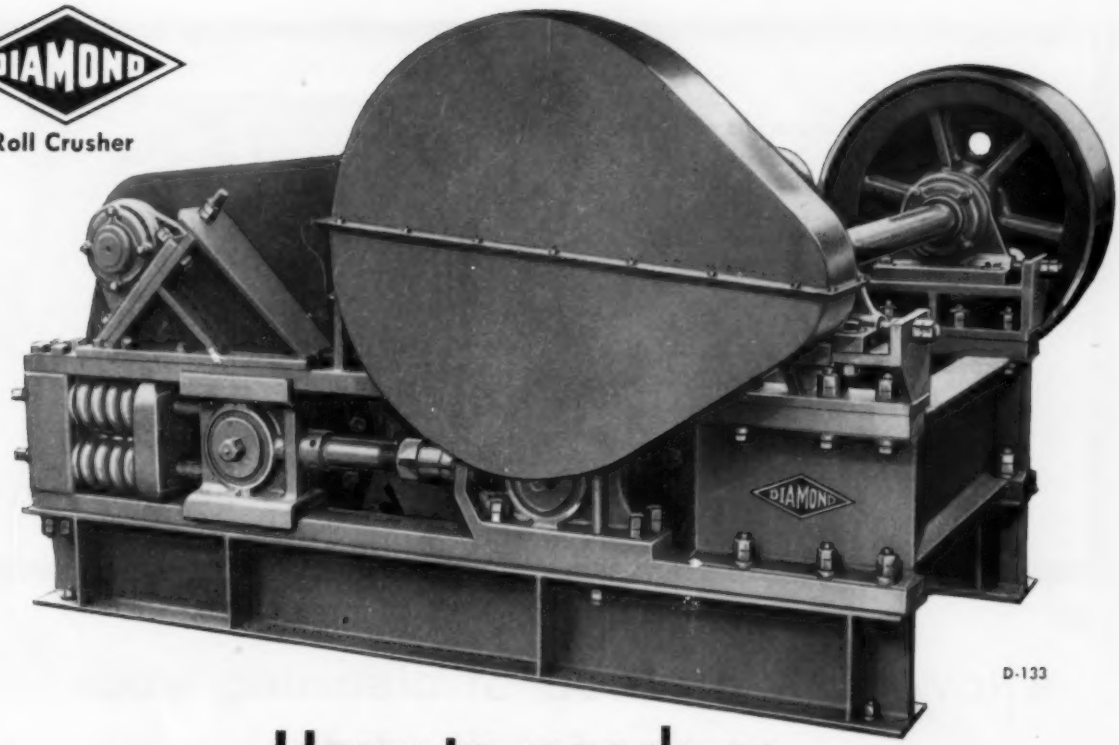

D-133

How to produce small aggregate at lowest cost —

No other unit is as effective for producing small aggregate as a Diamond Roll Crusher. This is particularly true when it is used to process oversize aggregate produced by preceding crushers.

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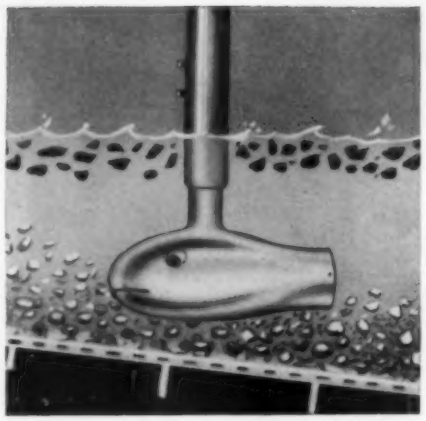

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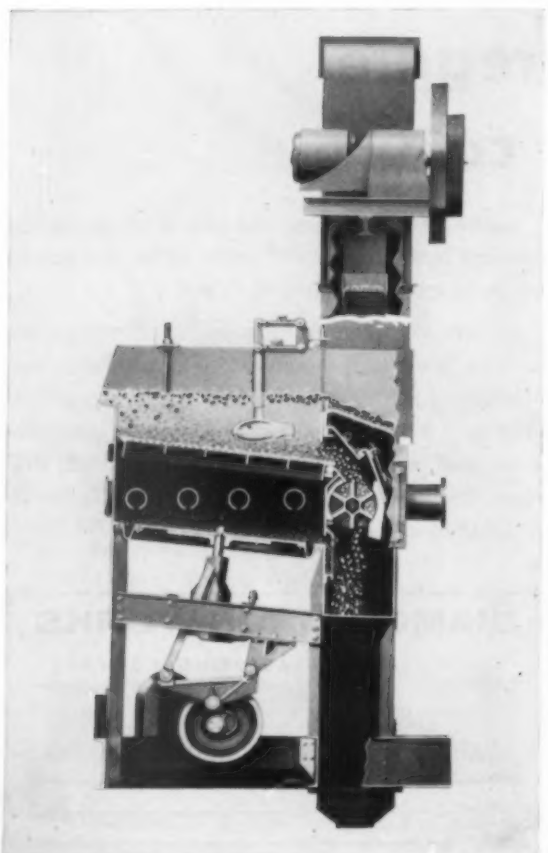

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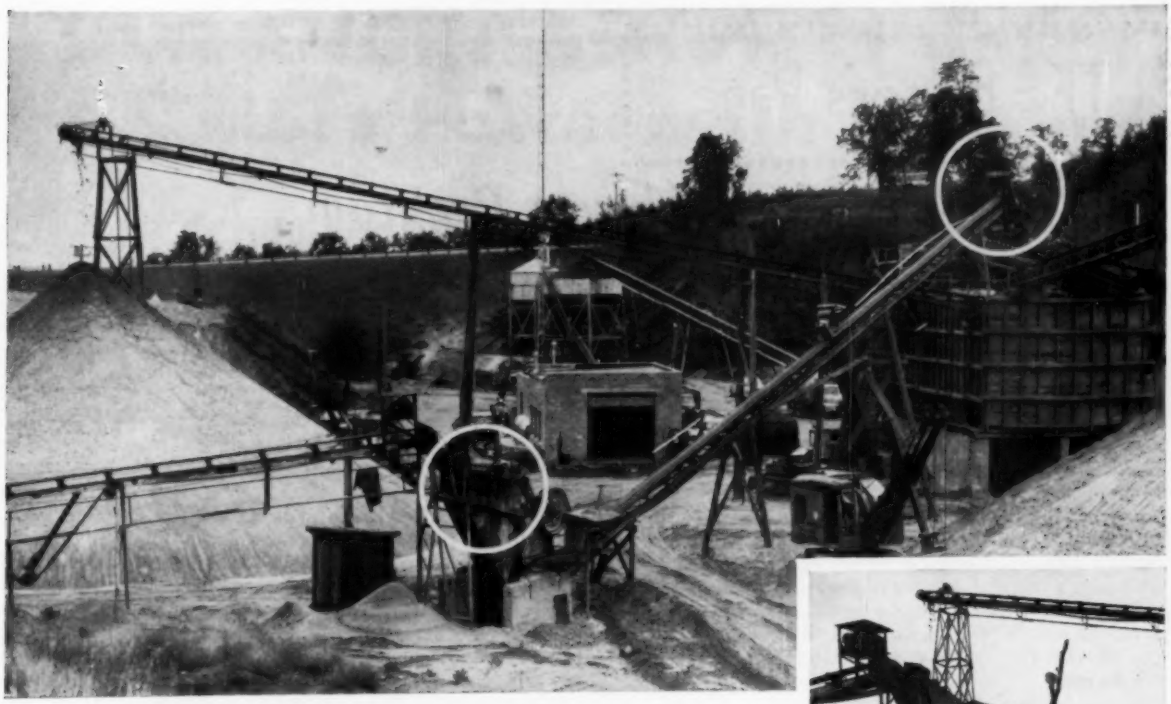

"We added the second Deister because the first solved our maintenance problems"

. . . says T. W. Becken, President of Cemstone Products Company, St. Paul and Lakeland, Minnesota. That first screen, installed in July 1952, is a Deister UHS double-deck 4′ x 12′. Previous to its installation, Cemstone had excessive maintenance from transmitted vibration . . . and bearing troubles on a competitive screen.

The floating action and over-size springs of that first Deister UHS cushioned vibrations to the supporting structure, the hopper no longer shook, bearing troubles were absent, and production went up.

That's why the second screen is also a Deister! It's a 3′ x 8′ single-deck scalping screen . . . a model UHS installed at one of the Lakeland plants. BOTH screens have been in use approximately 5 years AND THE *TOTAL* MAINTENANCE COST HAS AVERAGED OUT AT ONLY $10 A YEAR! And this . . . on a plant production schedule of 800 yards a day, 5 days a week from April through October, often with 2 shift periods totaling 16 hours a day.

Says Art Bodsberg, Foreman of Cemstone's Lakeland Plant No. 1: "Both our first and second Deister screens give excellent service and have cut maintenance costs so low that the screens we continue to add in the future will be Deisters."

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- **Deister's exclusive adjustable slope panels**—independently adustable at both feed and discharge ends to increase or decrease screening angle.

DEISTER

DEISTER MACHINE COMPANY

1933 EAST WAYNE STREET, FORT WAYNE 4, INDIANA

The Editor's Page

The Highway Program

THE huge new highway program, officially designated H. R. 10660, the Highway Act of 1956, is now an accomplished fact. The differences between the House and Senate versions having been ironed out and the resulting bill having been signed by the President, the largest public works program in the history of this or any other nation is now law.

At long last, then, we have an adequate highway program, one which will eventually give us safe, fast, and economical transportation in and to all parts of the country, and which will be a vital factor in our national defense system. This program, the result of two years of legislative debate in Congress, is very similar to President Eisenhower's original 10-year highway program. Instead of being financed by the sale of bonds, however, this will be a pay-as-you-go proposition, with the highway users paying the cost through increased federal taxes on fuel, tires, trucks, etc.

THIS Federal-Aid Highway Act of 1956 will provide $32,500,000,000 in federal funds for road construction and, together with state matching funds, which are practically 100 percent assured, will form a $50,000,000,000 highway program. Approximately $25,000,000,000 was approved for completion, within the next 13 years, of the National Interstate System, a 40,000-mile network of limited access superhighways connecting more than 200 of the nation's cities. The states are to carry 10 percent of the cost of the interstate program and 50 percent of the primary, secondary, and urban highways.

While this is a 13-year program, the bill, as finally approved, authorizes specific funds for only the first three fiscal years, 1957 to 1959, inclusive. The later distribution of interstate funds for the remaining ten years will be subject to revised estimates of cost which will be made by the state highway departments in co-operation with the Bureau of Public Roads. The $6,550,000,000 funds for the first three years are apportioned as follows: Interstate System $4,700,000,000; primary highway system, $832,500,000; secondary or feeder roads, $555,000,000; urban highways $462,500,000. All states and Hawaii, Puerto Rico, and Alaska, are included. The new highway program, it is estimated, will bring the total highway construction volume over the next 13 years to over $100,000,000,000—an increase of nearly 60 percent over the current rate.

Every effort is being made to get this vast highway program under way early in 1957. State highway departments were given funds July 1 to get started on their programs and can immediately begin negotiating for new rights of way, contracting for engineering plans, or even scheduling bids. Over 11,000 miles of interstate system has already been mapped out. A provision in the bill will also permit State Highway Departments to contract beyond their annual apportionments for the first three years of the program, and be reimbursed later.

AN ITEM in the bill which has aroused some concern among aggregates producers particularly is the controversial Davis-Bacon prevailing wage provision which has been written into the new law. This requires the payment of wages to certain employees at a prevailing rate to be determined by the Secretary of Labor. It could mean a considerable increase in labor rates and construction costs. Under this Act, however, the Secretary of Labor will be required to consult with state highway department officials and give proper weight to their findings before declaration of prevailing wage rates for any locality in which work is to be performed. This will apply to projects on the Interstate System only.

This expanded program of highway construction, needless to say, practically insures prosperity for many years to come for producers of cement, sand and gravel, and other materials used in highway construction. It will also provide a boost to our economy which will be more or less indirectly beneficial to all industry for an indefinite period.

The 1956 highway program will be so spread out that it will directly affect the business of every cement plant in this country. Every aggregate-producing plant will also be benefitted, directly or indirectly, depending on its proximity to the new construction. It has been estimated that for each billion dollars of new highway, 76,000,000 tons of aggregate and 16,000,000 barrels of cement will be required. This is a total of about 2,300,000,000 tons of aggregates and 500,000,000 barrels of cement in the next 13 years, or an average of about 175,000,000 tons of aggregates and 37,000,000 bbl. of cement annually. This is in addition to the current road program.

THERE is no doubt now that all of the needs for this program can be met. Rapid advances in highway engineering methods have virtually solved that shortage. According to the A. R. B. A., roadbuilders have the capacity to double the volume of highway construction in the next few years, and materials producers and equipment manufacturers will be able to supply all potential highway needs in addition to the growing demands of all other construction. The cement production capacity this year is expected to just about take care of all needs, and in 1958 and thereafter that industry's record expansion program should insure an ample supply. Aggregates producers have also been preparing for the increased demand and should be able to step up their capacity to meet these demands as they develop. Such unexpected developments as strikes may delay this program for short periods but will certainly not be permitted to impede it seriously.

We now have a highway program which will eventually meet our needs, and those directly connected with it will be kept busy preparing to meet the demand for their products and later producing it. It must not be forgotten, however, that in 1958 there will be an appropriation bill to continue the highway program. Then, and every two years thereafter, more funds will have to be appropriated and distributed.

Walter E. Trautfer

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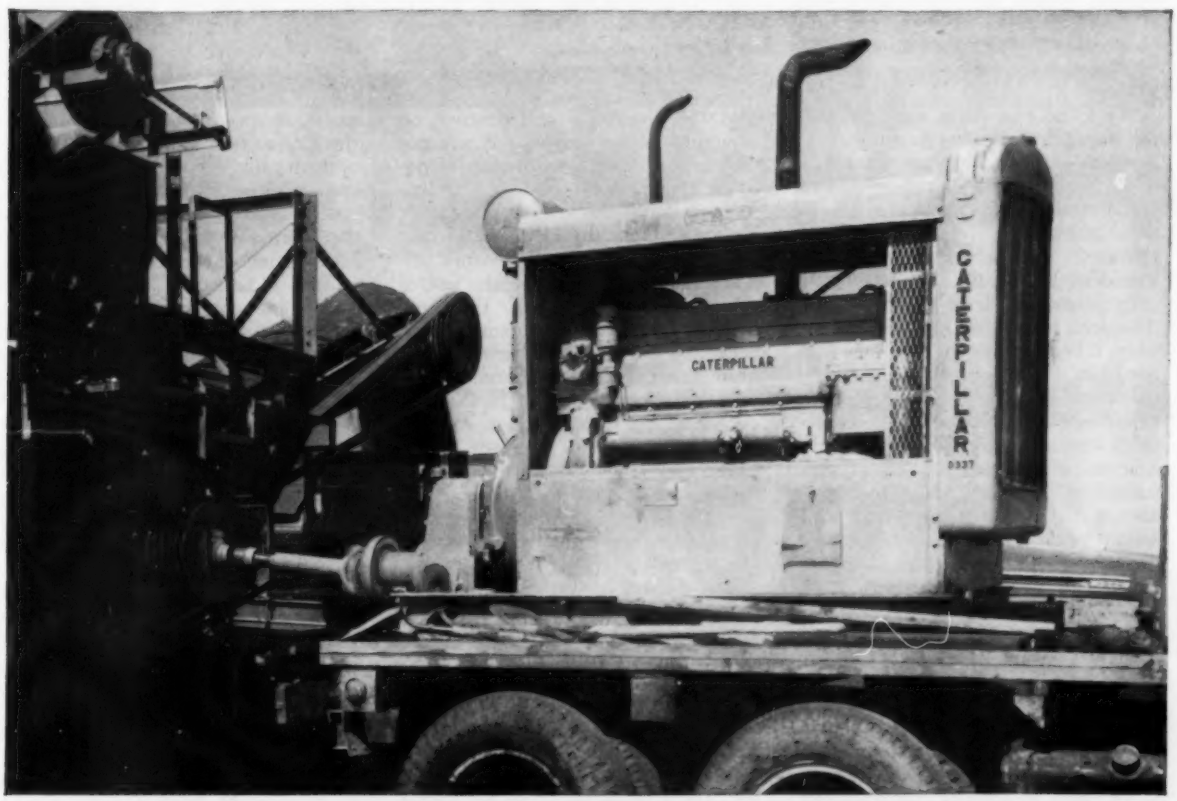
There is a complete line of *Texaco Ursa Oils* to meet the requirements of all diesel and heavy duty gasoline engines. All are especially designed to assure *more power* with *less fuel* over *longer periods* between overhauls.

For your air compressors, use *Texaco Regal Oil R&O*. It assures clean dependable performance. For wire rope and open gears, use *Texaco Crater* or (for added application convenience) *Texaco Crater X Fluid*. You'll keep rope strong longer, get longer gear life.

A Texaco Lubrication Engineer will gladly help you get greater efficiency and economy from all your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



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TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Washington News Letter

By S. HERBERT UNTERBERGER

THE President's unexpected new illness has reopened all the questions which seemed to be settled, at least until after the November elections. It now appears that this illness is unlikely to eliminate the President from the running, but it also appears that the President's operation will make the race more difficult. This is, no doubt, a combination of seriously undesirable circumstances for a man whose health is obviously uncertain.

The President's previous illness raised the question of whether he would run for office at all. Even considering his present illness, the Republican leaders, at least, are assuming that his commitment to run will not be altered; but the question of whether his running mate should be Nixon appears to be wide open again.

While no one dares say it aloud, the Republican leaders must face this problem — the voters are assuming that the President's chances of surviving a second term have diminished markedly. This problem is aggravated by the experience with President Roosevelt.

In retrospect, it is clear that the American people felt unfairly treated when it became known that they had not been dealth with forthrightly by President Roosevelt or his coterie when they were not warned of Roosevelt's waning health. It seems certain that the President's chances of surturned to office if the facts had been known. Also, if the facts had been known, Harry Truman might not have been an aceptable vice-presidential candidate. Actually, it is now clear from the Truman memoirs and other sources that not even Truman was aware of the state of the President's health and no effort was made to prepare him for the grave responsibility which he was almost certain to inherit. As a consequence, the period immeditely after Roosevelt's death was one of confusion and ineptitude for which we are still paying a price.

Although President Eisenhower and his coterie are following a different approach in that the state of the President's health has been revealed and full discussion of it permitted, they are still bearing the brunt of the Roosevelt dissembling. It appears to them that the voters may not want to take the chance of living through another period like the one which followed Roosevelt's death.

Curiously, the beneficiaries of this whole unhappy development are likely to be the Democrats who used to be in Roosevelt's camp.

The whole question of discussing a man's health, rather than his competence in connection with his seeking public office, is distasteful. Nevertheless, it is now virtually impossible to prevent this matter from playing an exceedingly prominent role in the forthcoming campaign. It is hoped that the discussion will proceed on a dignified basis and that it will not degenerate into an exhibition of political quackery.

The virtual elimination of Senator Kefauver from the Democratic race by his debacle in the California primary may help to avoid the use of the crudest tactics. In the final weeks and days of that campaign, it became clear that Kefauver, when hard pressed, was prepared to revert to just such tactics. His attacks on Stevenson were much more than exhibitions of bad taste or intra-party bickering. Presumably out of desperation, he felt it necessary to use the half-truth, the exaggerated accusation, and other tricks out of the politician's bag.

The danger in the realignment of strength resulting from the recent evidence on the state of the President's health is that both parties may feel a sense of urgency, or even of desperation, which will encourage them to take some fairly extreme action.

To bolster party strength, increasing talk is being heard on both sides of a pre-election cut in taxes. The Democrats have been talking about this, off and on, for some time. Their strategy would be to wait until fairly well along in the present session of Congress and then to propose a tax cut, particularly for the lower income brackets. Their excuse would be that this is essential to support the sagging economy resulting from the relative slump in automobiles, housing, and other consumer hard goods.

Actually, the politics of the situation is that the Democrats believe they can achieve a political advantage out of this maneuver regardless of how the issue is settled. If the tax cut goes through, they will claim credit for it. If it does not go through, they can claim that they tried, but that the Republicans prevented it.

This tactic has been talked about for so long that it is no secret to anyone in Washington. To offset it, the Republicans may feel forced to do something about taxes first, even against their better judgment.

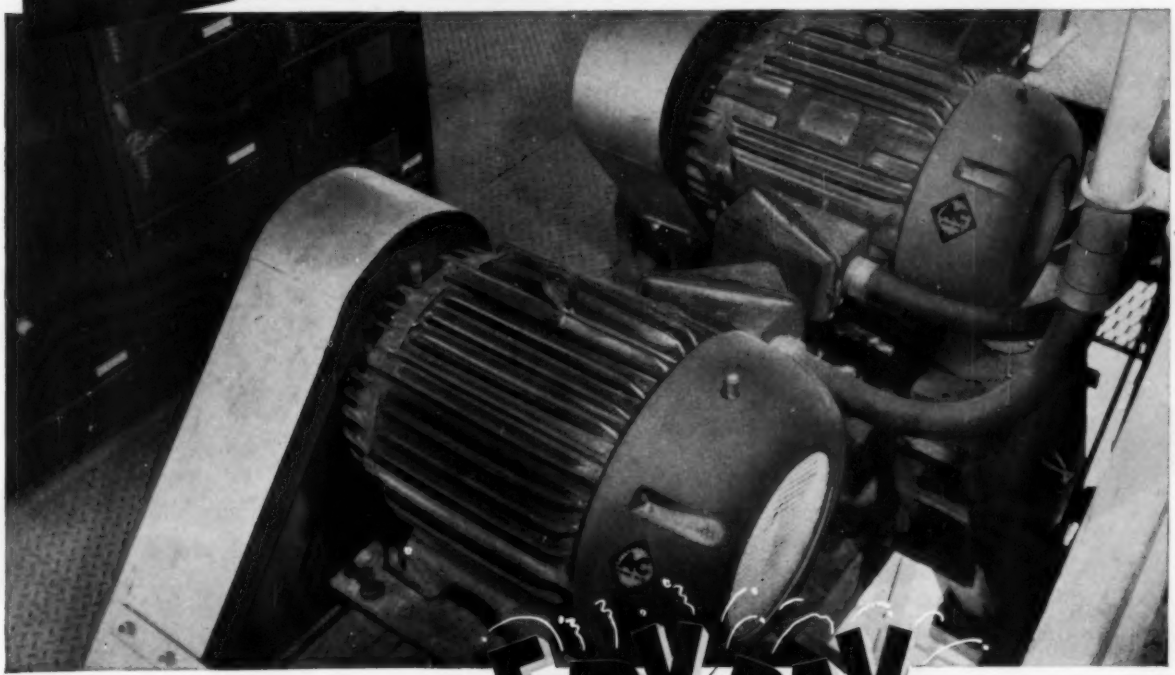
Strong support for tax reduction has developed recently from eminently respectable sources, such as the Committee for Economic Development, an economic research organization supported by so-called liberal businessmen, who are generally the businessmen found in the Eisenhower wing of the Republican party.

The C.E.D., as it is generally called, has come out quite strongly for a tax cut, now that the cash budget appears to be in balance. The cash budget includes all government income and outgo, including Social Security taxes. Essentially, this would mean that they are not very much concerned about whether the Social Security fund grows as rapidly as the liabilities it is incurring. This would violate the tenets of more conservative businessmen.

The principal basis which the C.E.D. gives for recommending tax reductions is that they are required for economic growth—that is, to provide the necessary incentive for enterprise and for venture capital. Accordingly, it would give a priority to tax cuts for upper incomes. C.E.D. believes tax rates in excess of 60 percent have a very serious inhibiting effect on economic growth.

Such a tax cut, of course, is not what the Democrats are talking about. Nevertheless, talk about tax reductions is on the increase; and political necessity may turn that talk into reality—even this year.

There's **MORE** Cooling Surface in these deep-ribbed **MOTORS**



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with these Allis-Chalmers MOTORS

● Frying of insulation is impossible under normal conditions with the extra-large cooling surface of Allis-Chalmers rib-type TEFC motors. The result—you expect and get longer motor life.

The engineered partner of A-C motors is Allis-Chalmers control.

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As a new machinery component or as replacement, specify Allis-Chalmers. Discuss your particular application with your nearby A-C distributor, A-C district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-4940

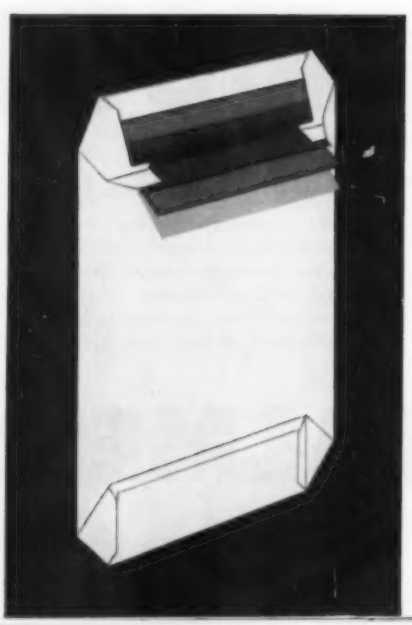
The Man from

takes steps to bring you a Multiwall

STEP I

HE'LL TELL YOU WHY THE CEMENT INDUSTRY HAS BOUGHT MORE THAN 150 MILLION ST. REGIS STEPPED-END BAGS

Because the Stepped-end Bag was invented by the European manager (Mr. Edgar Hoppe) of our International Division . . . because we've been turning out these bags since 1949...and because we've checked their performance under all sorts of conditions, the Man from St. Regis can give you facts and figures based on actual experience.



COSTS LESS THAN SEWN BAGS – For instance, you should see a little table of comparative savings of the St. Regis Stepped-end Bag over sewn bags. It shows a range of savings from $1.30 per M to $1.45 per M depending on the bag construction. In addition, one company, by using the St. Regis bag, found it possible to reduce the basis weight of their bag from 170 lb. to 150 lb., resulting in a yearly saving of $14,000 on mortar production alone.

BREAKAGE IS LESS – It's a proven fact that Stepped-end Bags have reduced bag breakage in the cement industry. For instance, by using the St. Regis Stepped-end Bag:

Company A reduced breakage to .2 of 1%
Company B reduced breakage to .1 of 1%
Company C reduced breakage to .28 of 1%

IMPROVED APPEARANCE, STACKING, HANDLING – The square-shaped package looks better . . . and the butt printing on either end allows easy identification of the product. As for stacking and handling – just ask the users (we'll supply names if you'd like). They'll tell you that the smooth ends make for neater stacking, easier handling.

St. Regis

Bag that cuts packaging costs

STEP 2

YOU TAKE THIS STEP FOR MORE INFORMATION. FILL IN THE COUPON.

Multiwall Packaging Division
St. Regis Paper Company, Dept. PQ-756
150 East 42nd Street
New York 17, N. Y.

Please send more information about the St. Regis Stepped-end Bag.

Name_____ **Title**_____

Firm_____

Address_____

City_____ **State**_____

Behind the Man from St. Regis stand experts in every field of packaging, ready to serve you.

ST. REGIS PAPER COMPANY

ROLLS ON A BIG "BIG V"

ing, easier handling.

WORLD'S BIGGEST "CAT"

Scaling 117,000 GCW*, Reo A-733 Carries Giant Caterpillar 270 Miles to Northern Quarry Site

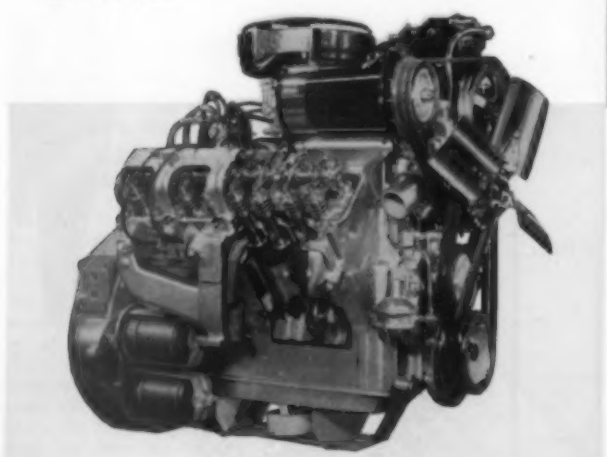
Rolling big loads like this is routine work for Reo's rugged "Big V's" in the construction field. That's because Reo Tandems are 100% truck built and powered to bear up under punishing performance on or off the highway.

Reo's giant 220 h.p. Gold Comet V-8 engines—with their advanced type short-stroke, wet-sleeve construction—deliver more pulling power to the wheels where power really counts . . . *in getting big loads quickly underway . . . and keeping them rolling smoothly on schedules that pay off in more trips per day.*

When you buy Reo trucks you don't gamble on engine performance . . . you buy proved performance—*backed by Reo's own 100,000 mile or 1 year warranty.* No other truck manufacturer offers you such positive assurance of quality and long life.

Reos range from 16,000 GVW to 78,000 GCW. Custom engineered to the job. For the Reo "Big V" that's best for your job, see your Reo Factory Branch or Distributor today.

**Special Permit*



This 220 h.p. V-8, Reo A-733 tandem is owned and operated by Michigan Tractor and Machinery Company of Detroit and Grand Rapids. As lower Michigan's exclusive Caterpillar distributor, they rely on Reo power to move heavy construction equipment like the new 35 ton D-9 tractor all over the state.

Reo short-stroke, wet-sleeve Gold Comet engines range from 100 to 220 h.p., Gas or LP-Gas, Sixes or V-8s. Up to 35% more efficient than the industry average. Models also available with 175 h.p. Cummins Turbodiesels.

REO MOTORS, INC.

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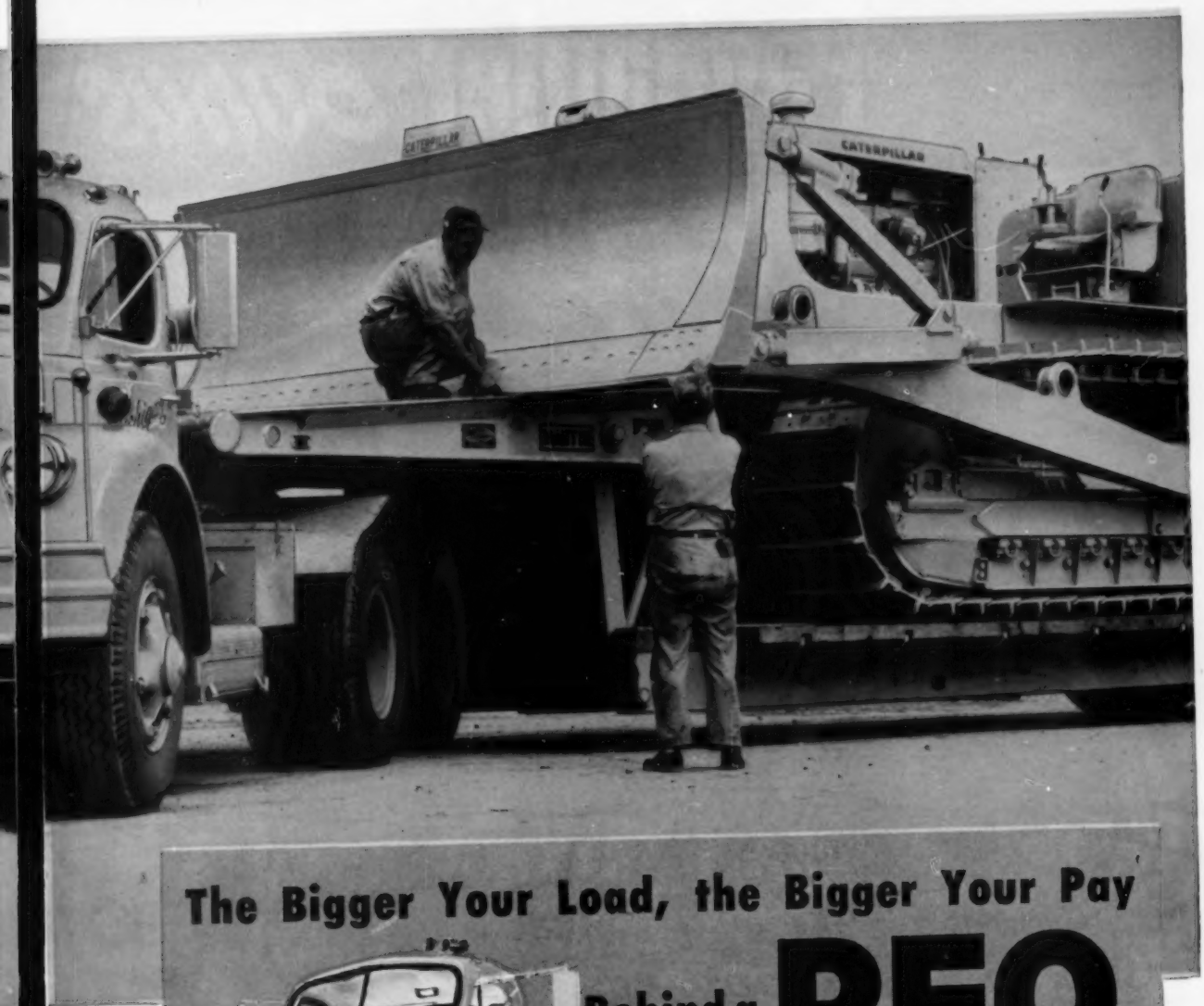
SUBSIDIARY OF **BOHN** ALUMINUM AND BRASS CORPORATION

ROLLS ON A REO "BIG V"



The Bigger Your Load, the Bigger Your Pay

Behind a REO "BIG V"

"Payload-Engineered" Trucks and Tractors

PUSH THIS PEDAL...

Payhauler® Bonus—

Try it

This new Model 95 Payhauler is carrying 24 tons of shovel-loaded limestone over the quarry floor, up the ramp to the crusher. A 4-speed torque converter transmission provides smooth speed changes and gives direct-drive performance through a lock-up clutch design. The Model 95 is also available with a 9 speed conventional transmission.

Try load-highballing turbo-charged diesel power in either the new 24-ton Model 95, or 18-ton Model 65 International Payhauler—with highest hp-per-ton of any similar-size off-highway trucks. Turbo-charging keeps cargo-power high, engine weight per hp low, cuts fuel costs 10%, or more—reduces upkeep.

Try the big-load-handling advantages of heat-defying, smooth-applying International Cerametallic clutch facings. No other clutch in any off-highway hauler gives such power-transfer efficiency, operating ease, or long life.

Try Payhauler "load-cradling", speed-gaining design! Semi-elliptic, multiple-leaf, free-floating springs swallow the "rock-shock" of big-shovel loading—and the mauling of 36 or 38 mph speeds. And brawny Payhaulers have the strongest main frames known of any off-highway haulers.

Try picture-window vision, ahead and to sides. Offset cab gives clear back-up view. Try changing speeds by *power-shifting*—steer with *power-steering*—dump with fast, responsive *power-hoisting*. You ride in "spring-hydraulic" cushioned seat comfort—fuel-up once daily! Try *new* Payhauler job efficiency! Have your International distributor give you a demonstration today!

Try new International® Powered performance

Try it..

Try a new Dirt-Heaping, Bid-Beating International Payscraper®. Overburden comes off fast when there's a high speed International Payscraper doing the stripping. A twenty-yard load takes less than a minute for the Model 75 Payscraper shown here with an International TD-24 push tractor. Compare payload-boosting Payscraper production to any other two- or four-wheel unit. See your International Construction Equipment Distributor for a demonstration today!

Try it..

Try new Bonus-Powered International crawler advantages! Try seconds-fast, true *in-seat* International gasoline conversion diesel starting—now standard equipment in all crawler models. Size-up the advantages of "control-tower" job vision—new booster steering ease—new Cerametallic clutching ease and efficiency—new 480-hour lube oil filters. Prove how bonus-powered performance boosts production, simplifies servicing! Try one, on your job.

TRY IT ON YOUR JOB!

See you at the ROAD SHOW, CHICAGO
Jan. 28 - Feb. 2, 1957

INTERNATIONAL HARVESTER

INTERNATIONAL® Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-Tired Loaders . . . Diesel and Carbureted Engines . . . Motor Trucks

THE STRONGEST WIRE MAKES THE STRONGEST ROPE... THAT'S WHY ONLY 1105 IS USED IN

ROEBLING

Royal Blue

WIRE 1105 ROPE

1105 WIRE is the strongest and toughest rope wire that has ever been developed.

Royal Blue is a new all-steel wire rope. It's made of 1105 wire—stands up in service—gives you more for your money because it has more to give.

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MERCER-FRASER USES "CHEAPEST POSSIBLE METHOD OF HANDLING GRAVEL"

This new CAT* D8 Tractor, 'dozing river run gravel into a Kolman portable screen with 30-in. belt, keeps 30 trucks busy. The D8 with No. 8U Bulldozer, owned by Mercer-Fraser Co. of Eureka, Calif., is on the job 48 hours a week except when operations are flooded out by the Mad River.

"For this type of work, this new D8 is ideal. The U-type blade handles big loads, and the D8's ability to reverse fast saves time. This is the cheapest possible method of handling gravel. No wonder we're 100% Caterpillar owners," says Ralph W. Brown, president of Mercer-Fraser. The firm has five other Caterpillar track-type Tractors on this job, producing 2-in. screened gravel for a new four-lane freeway near Arcata, Calif.

The new Caterpillar D8 Tractor (Series D with torque converter, or Series E with exclusive oil clutch) is built to handle *more material* at *lower cost*. Its four-cycle, completely new Cat Diesel Engine develops 191 HP. It has new, easy-operating controls and "live-shaft drive" that lets you operate rear-mounted equipment regardless of the flywheel clutch position.

A full line of Caterpillar-built Bulldozer blades is available for the new D8. Their scientifically curved moldboards provide good shearing and fast-rolling loads, and their heavy-duty construction stands up to equipment-busting work around rock. Your Caterpillar Dealer – who provides fast service and dependable factory parts – will gladly demonstrate the new D8 Tractor. It can do the most work for *you* at the lowest cost. Call him today.

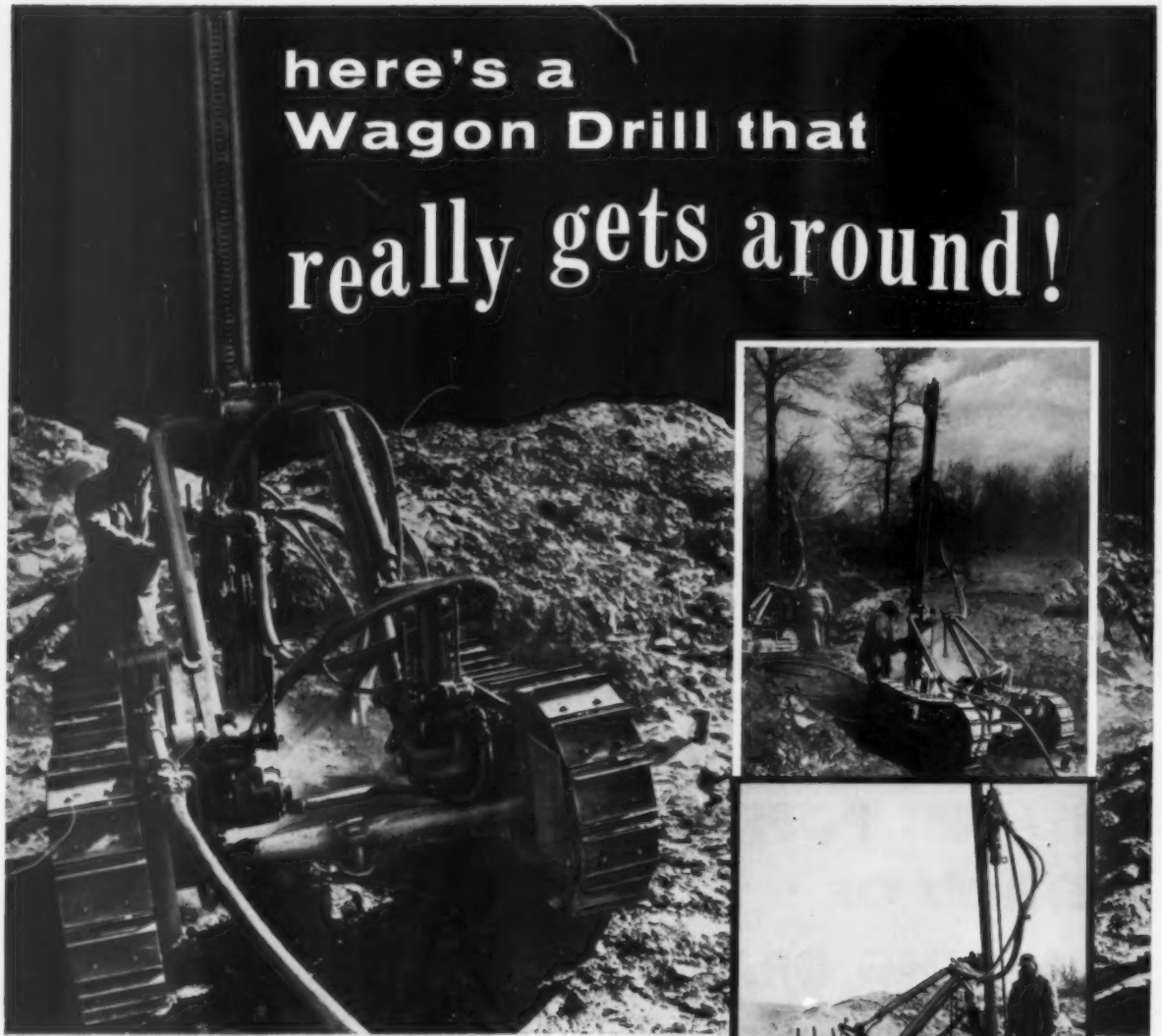
Caterpillar Tractor Co., Peoria, Ill., U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

here's a Wagon Drill that really gets around!



the G-800 Tracdril

- Self-Propelled
- One-man Operated
- Tows Own Compressor

Combine the drilling speed of the hard-hitting CP-70NDC Drifter with the adaptability of a CP Drill Carriage and U-arm . . . add the maneuverability of a self-propelled track-mounting that tows its own air supply over rough terrain . . . and you have the One-Man CP Tracdril.

Reversible tramming motors enable the Tracdril to go forward, backward and pivot . . . for faster "moving time" from hole-to-hole, more accurate spotting and more time for productive drilling. "Knee-action" tracks keep the hydraulically operated U-arm support level when operating on uneven ground. The Tracdril has plenty of reserve power . . . can tow a 13,000 pound CP 900 c.f.m. Rotary Compressor up a 10% grade. For details see your CP equipment distributor.

Chicago Pneumatic *8 East 44th Street, New York 17, N. Y.*

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News of the Industry

Wuerpel, Vroman Named To Vice Presidential Posts By Marquette Cement

Two new vice-presidents of Marquette Cement Manufacturing Company were elected recently by the directors of the company. They are Charles E. Wuerpel, technical director, and Lawrence H. Vroman, manager of engineering and construction.

Mr. Wuerpel joined the Marquette staff late in 1948 to head the Technical Department after a distinguished career in the U. S. Corps of Engineers. While he was with the Engineers, he worked on a number of important construction projects in various capacities. As vice-president he will continue to head the technical department.

L. H. Vroman

Mr. Vroman, a veteran of 30 years with Marquette, was named administrative chief of the engineering and construction departments last year. As vice-president he will continue in charge of the same phases of the company's operations.

Marquette's executive vice-president, D. S. Colburn, having reached retirement age, was relieved at his own request of the administrative duties of that office and re-elected vice-president with the status of consultant.

C. E. Wuerpel

Coming Events

October 1-3, 1956—Pebble Beach, Calif. National Sand and Gravel Association and National Ready Mixed Concrete Association directors' meetings. Del Monte Lodge.

October 10-12, 1956—Springfield, Mo. Operating meeting, National Lime Association. Kentwood Arms.

October 17-19, 1956—White Sulphur Springs, W. Va. Fall meeting, National Industrial Sand Association. The Greenbrier.

October 22-26, 1956—Chicago. 44th National Safety Congress and Exposition. Conrad Hilton, Congress, Morrison, and La Salle hotels.

Universal Atlas Cement Co. Reveals Plan for Purchase Of Site Near Lorain, Ohio

Universal Atlas Cement Company, a U. S. Steel Corporation subsidiary, has reached an agreement with the Baltimore & Ohio Railroad Company covering the purchase of land for a proposed cement plant near Lorain, Ohio. The 34-acre tract lies between the Black River and the B&O right-of-way; it has an approximate 2,400-ft. frontage on the Black River.

In announcing the agreement today, Charles B. Baker, president of Universal Atlas, emphasized that the land purchase is contingent upon approval by the Lorain City Council of certain changes in the city ordinances which the cement company considers necessary before it can proceed further with its construction plans.

Among the requirements which Universal Atlas will ask the City Council to consider for approval are: the establishment of a new dock line at the turning basin in the Black River; changes in the city zoning ordinance to permit the erection and operation of a cement manufacturing plant on the desired site; approval of the company's plans with respect to access roads; consent to connections to city sewage and water systems; and approval of a contemplated pumping station by which service water would be drawn from the Black River.

Mr. Baker explained that until these matters had been satisfactorily resolved, no further announcements will be released concerning the possible size or construction schedule of the proposed plant.

St. Lawrence Cement Co. Reports Profit in 1955

For 1955, its first year in operation, the St. Lawrence Cement Company, Quebec City, Que., Canada, reports a net profit of $395,251, or $1.26 a share.

Production and sales exceeded the first-year target of 1,500,000-bbl. of cement. Productive capacity of the Clarkson, Ont., plant, to be opened next January, will be 3,000,000 bbl. a year, making the total capacity 4,500,000 bbl.

Monarch Cement Reveals $6,500,000 Expansion Plans For Humboldt Facility

A $6,500,000 expansion program announced on July 5 by the Monarch Cement Company, Humboldt, Kans., will increase the annual capacity of this producer of portland, masonry, and specialty cements by more than 50 percent. At completion next year, the expanded operation will provide an output of 2,250,000 bbl.

The expansion program has been designed to provide for production-as-usual while the project is carried forward. New processing, handling, and control equipment to be installed will supplement or replace facilities now in use. Results are expected to produce one of the most efficient cement manufacturing installations in the country.

A new 450-t.p.h. crushing plant incorporating a 225-ton gyratory crusher will handle primary reduction. Following secondary reduction to a top size of ¾-in., raw stone will be transported about a half mile to the raw storage building on a new conveyor belt system.

A single-burner drying chamber, said to be one of the largest ever constructed, will be employed in a new technique of "flash drying" of shale and clay prior to blending these materials with limestone. The dryer will consume 150,000,000 B.t.u.'s per hour.

Two new 10- by 15-ft. raw grinding mills, driven by 850-hp. motors will be installed to process the shale, clay, and stone before feed to three 11- by 230-ft. kilns. Two of the latter are now in use, and the third will be installed as part of the expansion. Waste heat from the new kiln will be diverted to a new steam boiler that will be added to the others now in use in the power house. Turbogenerators will provide 12,000 kilowatts of electrical power.

A pair of 10- by 28-ft. finish mills will be installed to process clinker from the kilns. Other items in Monarch's expansion project include a new laboratory building with modern analytical and testing equipment, and a large maintenance and machine shop structure which will also house plant offices and employee shower and locker rooms.

The expansion is being directed by Monarch's engineering department. MacDonald Engineering Company, in charge of general plant layout, is the general contractor.

RUNE E. SWANSON has been appointed controller of International Minerals & Chemical Corporation, Chicago, Ill.

International Harvester Shows New Equipment At 2-Day Demonstration

Climaxing a two-day press gathering on May 14 and 15, attended by nearly 100 trade press editors from all over the country, the International Harvester Company staged a showing of its full line of construction equipment at the company's Dundee, Ill., proving ground. In addition to advanced models of conventional machines, two items of equipment recently added to International's line of products were exhibited for the first time. These were 18- and 24-ton rear dump, off-highway Payhauler trucks and a completely new 1¾-cu. yd., rear engine tractor-shovel on crawler tracks known as the Model 12 Payloader.

The Model 65 (18-ton) and Model 95 (34-ton) rear-dump Payhaulers exhibited at the 2400-acre proving ground near Dundee — one of the company's three proving areas—represent the results of testing on 44 different applications in quarries, mines, and other related fields. They are reported to be the fastest (36½ m.p.h. on the Model 65 and 37.2 to 38 m.p.h. on the Model 95) and among the most powerful off-highway haulers on the market. Horsepower ratings of 250 and 335, respectively, are provided by Cummins turbo-charged diesel engines.

The new International Model 12 Payloader, a rear-engine high-speed tractor equipped with a front-end loader, is reported to be the culmination of five years of development and testing backed by the experience gained in production of more than 25,000 rubber-tired tractor-shovel units by the Frank G. Hough Company, a wholly-owned subsidiary of International Harvester.

Equipped with a rear-mounted 9½-hp. engine that also serves as a counterweight, the unit has a mid point location for the operator's seat and controls. The unit is designed to provide the 1¾-cu. yd. standard bucket with a breakout or digging force of 17,500 lb., and the load can be discharged from a 7-ft. dumping height.

Other equipment demonstrated for the press included the International-Drott four-in-one Skid-Shovel, a TD9 Skid-Shovel and scarifier, and TD14 tractors with hydraulic bulldozer and Drott logging rack attachments. Six Hough Payloader models were shown; and two 1956 Pay-scraped models—a 14-cu. yd. 2T-55, and a 20-cu. yd. 2T-75—were demonstrated.

Harald T. Reishus, vice-president, construction equipment division, headed the group of International Harvester officials who were hosts for the two-day press party.

Just introduced, this 24-ton off-highway haulage truck has a top speed of 37.2 m.p.h., with a 9-speed constant mesh transmission, and 38 m.p.h. with 4-speed torque converter.

Photo by International Harvester Co.

This new crawler-mounted front-end loader is a new addition to International's line of equipment. Center seat design is said to give the operator an unusual visual advantage.

Photo by International Harvester Co.

EAGLE Washing-Classifying Section Processes 325,000 Tons Air Base Aggregate in 5 Months.

When an experienced, successful aggregate producer like Elmer Larson, Inc., with headquarters in DeKalb, Illinois, reorders the same equipment again and again, you can be sure that equipment must be right.

Elmer Larson, Inc., operating Eagle equipped plants in Illinois, recently installed the complete Eagle Washing-Classifying Section at their Peru, Indiana, plant which—like the others is performing highly satisfactorily. It has processed 325,000 tons of material in 5 months and has 220,000 tons yet to be furnished on the contract for air base material.

Material to tough Navy specifications is being produced. The Eagle section consists of two 30′ Eagle Double Log Washers to scrub, abrade and clean gravel; an Eagle 28′ Water Scalping-Classifying tank with a 2-cell Collecting-Blending Flume; a 24″ dia. x 22′ Single Screw Fine Material Washer-Classifier-Dehydrator which recovers fines from a 2-deck gravel wet screen, and a 36″ dia. x 25′ Double Screw unit processing concrete sand.

46% of Eagle equipment installed nationwide are repeat orders —you can depend on Eagle equipment to do the job—it is built for you to profit, not pamper. You can profit from Eagle's experience.

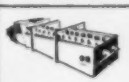
Send for Catalog 55.

EXPERIENCE, PROGRESS, SERVICE SINCE 1872

The EAGLE LINE

FINE MATERIAL WASHERS

COARSE MATERIAL WASHERS


LOG WASHERS

WATER SCALPING—CLASSIFYING TANKS.

"SWINTEK" DREDGE LADDERS

COMPLETE DREDGES

BREAKER BALLS & PILE HAMMERS.

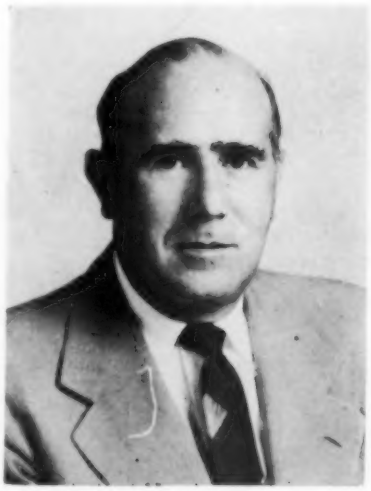
EAGLE IRON WORKS

133 HOLCOMB AVE., DES MOINES, IOWA

O'Mara and Flodin, Inc., Air Separation Specialists, Organized at Los Angeles

Organization of O'Mara and Flodin, Inc., Engineers, has been announced by Richard F. O'Mara and Carl R. Flodin in Los Angeles, Calif. According to the partners, their work encompasses dust and fume control and the drying and air separation fields. Emphasis is on studies, reports, preparation of specifications, and engineering analyses for equipment applications and layouts in industrial plants. Assignments will be accepted at points anywhere in the United States. Headquarters are located at 1111 Wilshire Boulevard, Los Angeles.

Mr. O'Mara, a mechanical engineering graduate of Purdue University, has been active in the fields of dust collection, drying, and air separation since 1927. For ten years he was affiliated with the Raymond Division of Combustion Engineering, Inc., where he was engaged in engineering for grinding, drying, dust collection, incineration, and associated process systems. He joined Western Precipitation Corporation as general sales manager in 1937 and was put in charge of engineering sales for Cottrell electrical precipitators, cyclonic collectors, and other industrial products until he resigned in 1955.



Richard F. O'Mara

Mr. Flodin received his degree in electrical engineering from the University of Washington. He was employed for several years by the electrical engineering departments of the Commonwealth Edison Company and the Consolidated Edison Company of New York, Inc. During World War II he served as construction engineer in the Defense Plant Corporation magnesium plant operated by the International Minerals and Chemical Corporation at Austin, Tex. When this plant was discontinued, he joined Western Precipitation Corporation to work on the design and application of Cottrell electrical precipitators for the heavy industries.

Carl R. Flodin

Gorman-Rupp Contractors' Pump

KEEPS PENNA. DAM JOB MOVING

Photo by Jerry Pratt, Constructioneer

Near Spring Grove, Pennsylvania, a 1,100,000,000-gallon earth dam is being constructed for P. H. Glatfelter Co., producers of paper, by Central Pennsylvania Quarry, Stripping and Construction Co. Seepage in the spill-basin is quickly removed by a Gorman-Rupp 90M Pump, Model 3602, letting work proceed on the removal of solid rock. The pump stands about 20 feet above water level and is discharging over the rise, as shown in the upper right of the picture. The 500-ft. spillway chute handles overflow from the 2½-sq.-mile dam.

Keep *your* job moving with a Gorman-Rupp Contractors' Pump. It is guaranteed in plain language.

Gorman-Rupp PUMPS

THE GORMAN-RUPP COMPANY

305 Bowman Street • Mansfield, Ohio

30,000,000 Tons of Gravel To Be Moved into Lake To Build New Roadbed

A giant conveyor system that will generate its own electrical power and set new speed records for material handling will soon be built by Hewitt-Robins, Inc., to move 30,000,000 tons of gravel from a Utah hill into the famous Great Salt Lake.

The gravel will be used in constructing a 13-mile roadbed for the Southern Pacific railroad across the lake, replacing a 52-year-old trestle mounted on wood piles. The big earth-moving operation is scheduled to start next October and is expected to be completed in 26 months.

The conveyor system is nearly 2 miles long and will handle the gravel at an average rate of 75,000 t.p.d., a U. S. record for overland conveyors. When operating at full capacity, the rate can be increased to 90,000 tons, working three shifts totaling 21½ hours. The speed of the belts will be 800 f.p.m., exceeding usual belt speeds by 300 to 400 f.p.m.

The gravel will be put through a screening and crushing process to reduce all lumps to 8 in. or under before it is fed onto the 54-in. wide conveyor belts. After a downhill ride of a little less than two miles, the material will be transferred to a stacking conveyor, which will build a storage pile 70 ft. high. Under the pile will be two tunnels, each having a conveyor running through it. These conveyors will be 72 in. wide and will have a combined capacity of 12,000 t.p.h., running at 550 f.p.m. The material will be fed to the tunnel conveyors by a series of overhead feeders to control the rate of flow to any tonnage desired. These conveyors will carry the material about 250 ft. to the edge of the lake and dump it into barges. There will be seven of these barges shuttling between the discharge point of the conveyors and the new roadbed.

3-M Reports Sales, Profits In 1st Qtr. Best in History

Record first quarter sales of $75,706,190, a 20 percent increase over $63,382,846 for the first three months of 1955, were reported by the Minnesota Mining & Manufacturing Company, St. Paul, Minn.

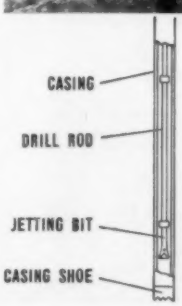
First quarter earnings were $8,632,518, or $1.04 per share, compared with $7,452,170, or $.91 per share, for the same period last year. Net income before federal and Canadian income taxes was $17,424,518, compared with $15,296,170 in '55.

• In this view of the road material plant operated by the McCammon-Wunderlich Company near the resort city of Palm Springs, Calif., a bulldozer can be seen on the hillside, left, 'dozing aggregates from the mill directly to the crusher.

What's down there?

Empire
TEST DRILLS
come up with the
RIGHT ANSWERS

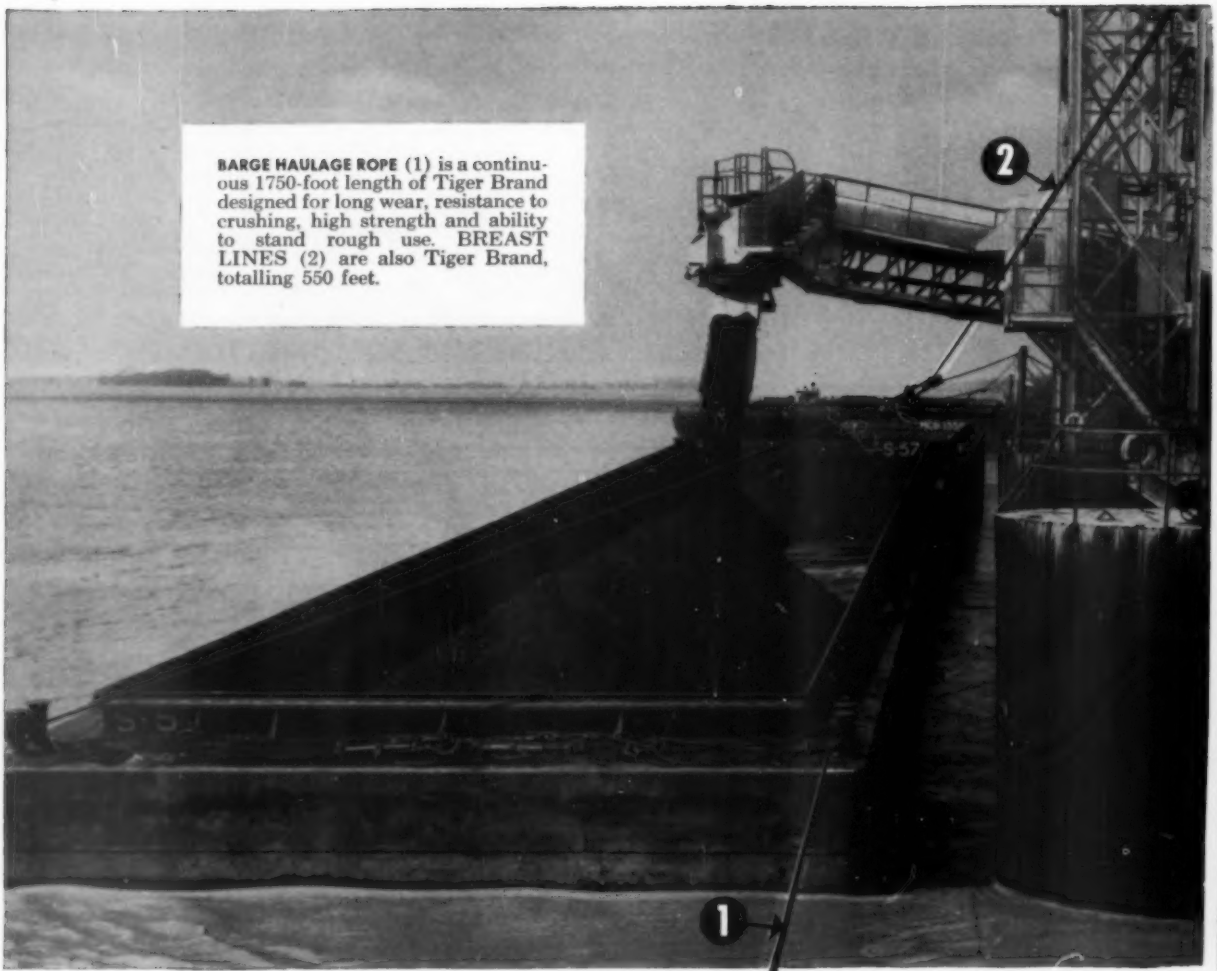
EMPIRE
Hydraulic
Testing
Drill



This test-drilling equipment is a "must" for pit and quarry operators and general contractors.
The EMPIRE Junior Drill used manually with solid rods or the EMPIRE Hydraulic Jetting Drill, using hollow rods, is the standard method of exploring sand and gravel deposits for composition and presence of clay, and accurately determines overburden depth and formation.
Easily transported in any kind of terrain. Assembled and ready for work in minimum time with ordinary labor.

Write TODAY for complete details

NEW YORK ENGINEERING CO. 75 WEST STREET NEW YORK 6, N. Y.



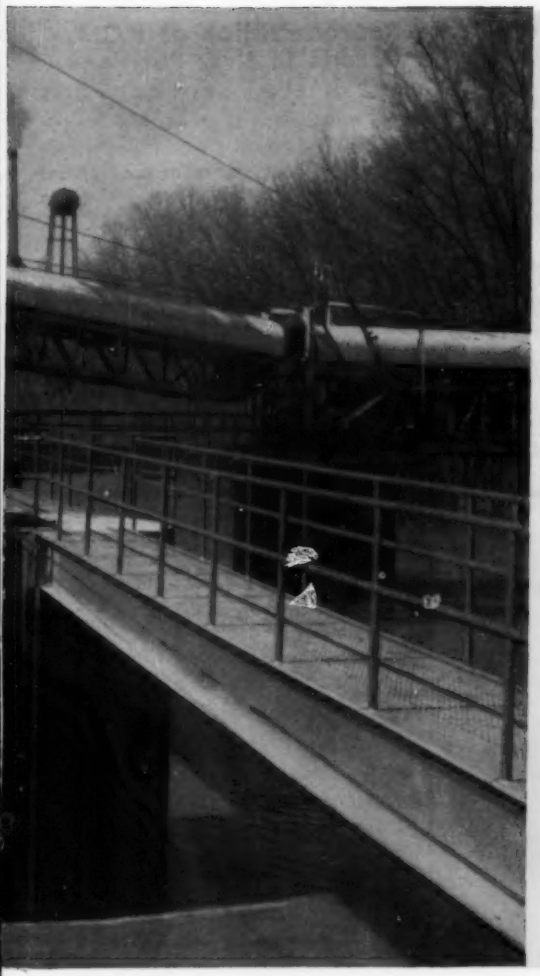
BARGE HAULAGE ROPE (1) is a continuous 1750-foot length of Tiger Brand designed for long wear, resistance to crushing, high strength and ability to stand rough use. BREAST LINES (2) are also Tiger Brand, totalling 550 feet.

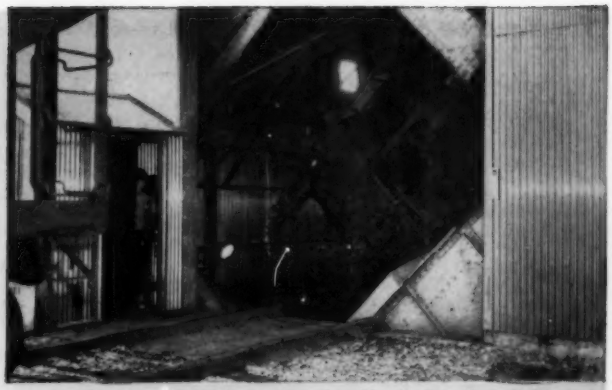
Yankeetown Dock

15-TON BOOM HOIST rigged with Tiger Brand Rope for most economical performance.

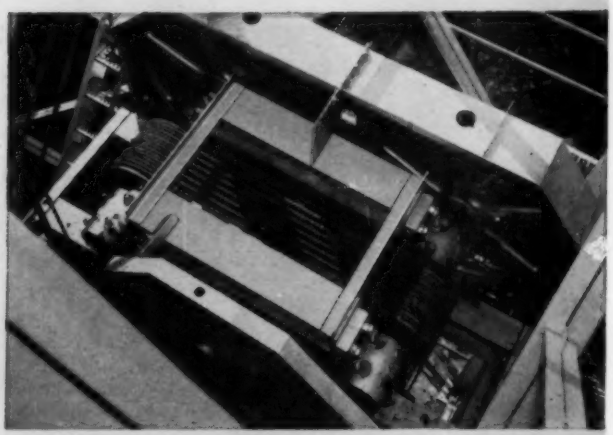
CONVEYOR uses 13 lengths of Tiger Brand Rope for belt tensioning, counterweight, boom braces, etc.

WIRE ROPE ASSEMBLY with hinged clamps for attaching barge to main haulage rope.





ROTARY CAR DUMPER is equipped with 14 lengths of Tiger Brand Rope for operating and counterweight ropes.



DOUBLE U GROOVED TRACTION DRUMS between which the barge haulage rope is reeved to form 15 parts.

loads 10,000 tons of coal per day

Unique barge haulage system operated by 1750 feet of Tiger Brand Wire Rope.

The Yankeetown Dock on the Ohio River in southern Indiana is a co-operative enterprise of the Ayrshire Collieries Corporation and the Northern Illinois Coal Corporation. It was designed to handle the output of the Wright and Victoria mines, providing barge loading of about 10,000 tons per day of processed coal.

The unique feature is the barge haulage system which uses one continuous 1750-foot length of ¾" Tiger Brand Wire Rope. This is driven from Double U Grooved Traction Drums and runs through sheaves to both extremities of the dock. From there the rope comes back unsupported to the center of the dock and is spliced to provide a continuous circuit.

The empty barges are attached to the haulage rope at the down-river end of the dock and are pulled under the conveyor chute and loaded in 1½ hours each.

The main haulage rope takes the worst beating. It is subject to immersion, chafing, and damage from crushing, in addition to bending fatigue and abrasion. For this important application, the Tiger Brand Specialist recommended the rope best fitted to give good service.

In addition to the haulage rope, the entire dock installation included fifteen other important wire rope applications on the car dumper and conveyor system. All of these were supplied from standard Tiger Brand constructions where you can always find the "Right Rope for the Job."

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

Permanente to Construct 1,400,000-Bbl. Cement Plant At Scholle, New Mexico

Engineering for New Mexico's first cement plant was begun by the Permanente Cement Company at Scholle, approximately 55 miles southeast of Albuquerque. The 1,400,000-bbl. capacity plant is the first step in a proposed $10,000,000 investment in New Mexico.

Kaiser Engineers Division of Henry J. Kaiser Company is handling the design of all facilities. Completion of the plant is scheduled for the fall of 1957.

Designed as a single-kiln operation, the New Mexico plant will use the wet-process method of manufacture. Allowance will be made for future expansion as market requirements increase. Exploratory drilling indicates reserves of excellent cement-grade limestone.

ROBERT W. MARVIN was recently elected vice-president of Dravo Corporation, Pittsburgh, Pa. Mr. Marvin, a director of the corporation, and general manager of the engineering works division, has been with the company since 1927.

Reorganization at P.C.A. Results in New Positions For Reene, Corning, Paris

An announcement released by the Portland Cement Association reveals organization changes in the general headquarters staff of its promotion division, headed by James D. Piper, vice-president.

The changes, effective June 1, were made to broaden responsibility for the organization's expanded promotion program. The former position of director of promotion has been divided by the creation of the positions of director of promotion planning and engineering services, and director of educational services.

The position of director of educational services will be filled by Charles W. Reene, formerly advertising and promotion manager, Hough Manufacturing Corporation. Mr. Reene will supervise the association's activities in the fields of advertising, public relations, publications, and educational films. He is returning to the association, which he served from 1949 to 1953 as assistant to the advertising manager.

Leo H. Corning, who has been given the new title of director of promotion planning and engineering services, will be able to devote full time to the expanded requirements of technical promotion.

George H. Paris, formerly assistant director of promotion, has been appointed assistant to the vice-president for promotion.

Georgia Marble Acquires Alberene Stone Corporation

The Georgia Marble Company, Tate, Ga., has assumed control of the Alberene Stone Corporation, Schuyler, Va., the world's largest producer of soapstone. Georgia Marble recently acquired a majority of the stock of the 21-year-old Schuyler concern, and the transfer took place at a board meeting.

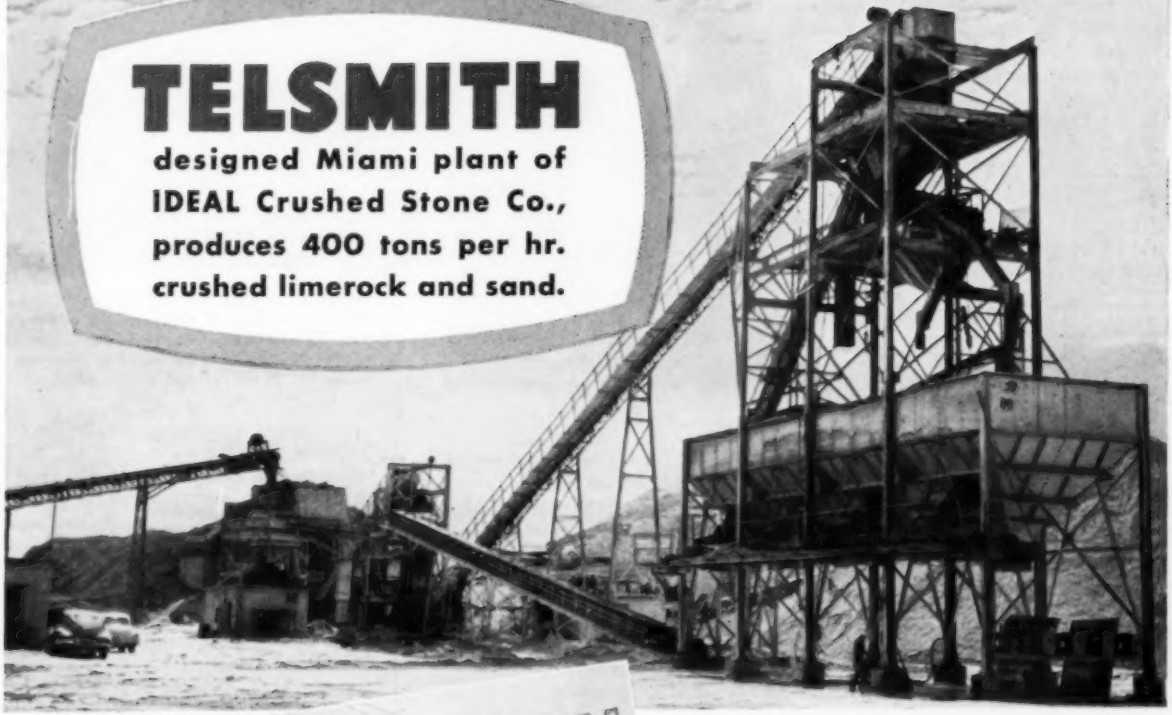
John W. Dent, president of Georgia Marble, was elected new chairman of the board; S. E. Hyatt, president; William L. Vance Jr., J. D. Robinson Jr., and Granger Hansell, directors.

The 38th annual meeting of Associated Equipment Distributors will be held from January 27 to 30, 1957, at the Conrad Hilton Hotel in Chicago, Ill. This meeting is scheduled during the same week as the American Road Builders Association road show at the International Amphitheatre in Chicago.

"IDEAL" aggregate for Florida market

TELSMITH

designed Miami plant of IDEAL Crushed Stone Co., produces 400 tons per hr. crushed limerock and sand.



Telsmith 30" x 25' Twin Screw Sand Classifier.

•

Telsmith 5' x 12' double deck special heavy-duty Vibro-King Screen.

● With a capacity of over 400 tons per hr; 60% rock, 40% sand; this Telsmith-designed plant makes 6 sizes: ¾" to 2½" ballast; 1"-¾", ¾"-½", ½"-⅜", ⅜"-3/16" rock; 3/16" sand. A 4½-yd. dragline digs the raw material; self-dumping barges transport it to plant.

● Ballast goes to railroads. Aggregate qualifies for Florida State, County, and City specs; U. S. Army Engineers; ready-mix, concrete-block, and concrete pipe plants. Send for Bulletin 266.

Q-32

PLANT EQUIPMENT—Two 60" x 8' Heavy Duty Plate Feeders • 5' x 12' Special Heavy Duty Vibro-King Scalper ahead of 30" x 50" single roll primary crusher •5' x 12' 2-deck Vibro-King Scalper ahead of reversible impactor secondary crusher •5' x 12' 2-deck and 5' x 14' 3-deck Vibro-King Finishing Screens for rock sizing •2' x 8' 1-deck Vibro-King Screen for fine sand •30" x 25' Twin Screw Sand Classifier for coarse sand •24" x 20' Single Screw Sand Classifier for fine sand •All Telsmith except crushers.

SMITH ENGINEERING WORKS

504 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • Cable Address: Sengworks, Milwaukee

Consumers Co. Open House At Crystal Lake, Ill., Plant Attracts Crowd of 250

Consumers Company, one of the leading producers of sand and gravel, ready-mixed concrete, and building materials in the Chicago area, held an open house for contractors, architects, building officials, and other guests at the firm's new production plant near Crystal Lake, Ill., on June 16.

Upwards of 250 visitors toured the extensive facility in buses, inspected what is probably one of the most modern producing plants in operation, and enjoyed a luncheon. Several of the company's executives were on hand to explain all the workings of the latest in modern machinery and equipment. These facilities will be used in the designed production of 450 t.p.h. of sand and gravel.

A group of visitors enjoying lunch at the official opening of Consumers Company's new Crystal Lake, Ill., sand and gravel plant. Harry Clark, president of the company, sits at the far end of this table.

This sand and gravel output will serve the two outlying ready-mix plants of the company, located at Arlington Heights and Upton (near North Chicago) Ill., and will also supply the material yards at the company's quarries at Bellwood and McCook, Ill. The remainder will be sold to local commercial users.

Lehigh to Build Cement Plant In Florida Everglades

Construction of a $20,000,000 plant in the Florida Everglades has been announced by Joseph S. Young, president of the Lehigh Portland Cement Company. Rock will be reclaimed from beneath the sawgrass and muck of the Everglades.

The proposed plant, scheduled to be in operation at the end of 1957, will produce 2,000,000-bbl. of portland cement annually.

When the Miami plant and other expansion projects now in progress are completed, the company's total annual capacity will be more than 30,000,000 bbl.

A new $500,000 sand, gravel, and rock plant was recently placed in operation by the Hartman Concrete Materials Company, near Maricopa, Calif. With a 300 t.p.h. capacity, it replaces an older 70 t.p.h. facility. The new plant was designed by Harold Fox, president of the company, in collaboration with the Los Angeles Conveyor Co.

Now Available!

NEWEST

PORTLAND CEMENT

PLANT MAP

We are pleased to announce that our new Portland Cement Plant Map is ready for distribution. The map shows the locations of all the portland cement plants and distributors now operating in the United States, Canada, Mexico, Alaska, Hawaii, and Cuba, plus those that will be completed in 1956. These plants are listed alphabetically, by state and city, so they can be located easily. Production capacity in barrels, types of process, and brand names of each firm's products are also shown.

In order to avoid confusion, distributing plants are listed separately at the bottom of the list. Distributors are also listed alphabetically by state and city.

The map is 34 by 40 inches and is printed in black and white on heavy, durable 60-lb. paper stock. Prices are as follows:

1-10 maps $1.00 each
11-25 maps $ .75 each
more than 25 maps $ .50 each

Previous editions of similar maps were received with such great enthusiasm that our supply was soon exhausted. Therefore, we suggest that you order your maps now, so that you will be sure you will get as many copies as you order.

Please make your request for these maps on your company letterhead. Also, send along a check, cash or money order to cover the number of maps you wish to purchase.

Irving Crown Appointed To Post of President Of Material Service Corp.

Irving Crown has been elected president of the Material Service Corporation, Chicago. Mr. Crown, as a student engineer, was one of the founders of Material Service in 1919, and has since served as executive vice-president. (Material Service Corporation has been without a president since the death of Colonel Horatio B. Hackett in August, 1941. Colonel Henry Crown, chairman, has served as chief executive officer.)

Material Service Corporation is the parent company of the Marblehead Lime Company, and the Freeman Coal Mining Corporation, both of Chicago. Mr. Crown will continue to serve as a vice-president of both subsidiaries.

Mr. Crown has been active in all phases of the company's operations, particularly in production and distribution. He pioneered the use of river transportation of sand, gravel, and limestone on the Sanitary and Ship Canal between the company's several plants and its numerous Chicago distributing yards. Mr. Crown also engineered the first commercial barge delivery of sand and gravel after the opening of the Illinois Waterway in 1928.

At the annual meeting of the company the stockholders re-elected all directors and named vice-president Robert Crown as a new director. He has served as a vice-president since his release from the U. S. Navy in 1946.

Irving Crown

Dust Collection Equipment Installed by Three Concerns

Correction of air pollution problems resulting from cement operations is receiving serious attention on the part of major producing companies. In the Dallas, Tex., area, according to an announcement made by H. A. Sawyer, president of the Lone Star Cement Company, this firm will install a $1,500,000 precipitator. Lone Star also plans to spend at least $287,300 to improve dust removal at its Houston operation.

Trinity Portland Cement Company's president, E. L. Gibson, revealed that his company had installed a $750,000 precipitator, which will serve two of its seven kilns at Houston.

At El Paso, Tex., new dust-collection equipment was reported to have been put into service recently at the Southwestern Portland Cement Company's plant. According to R. T. Mann, plant engineer, the new device will be useful for reclaiming valuable material, as well as for cutting down air pollution.

New Plant, Expansion Plans Proposed by Harbison-Walker

Earl A. Garber, president of the Harbison-Walker Refractories Company, has announced that the firm will erect a rotary kiln plant at Ludington, Mich., for the production of magnesite brick. Plans call for completion of the plant and the starting of production this year.

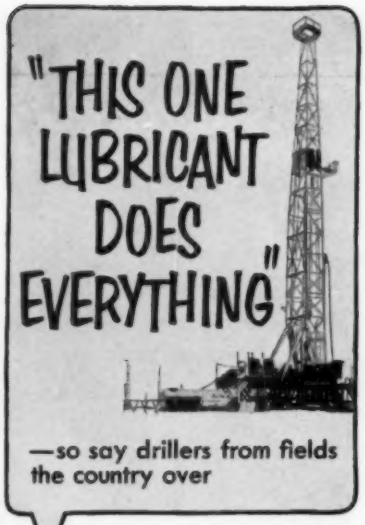
The new facility will operate in a raw-materials production tieup with the Dow Chemical Company plant at Ludington. Dow will furnish magnesium hydrate through a pipeline. Initial capacity will be between 200 and 240 tons per day.

Harbison - Walker also revealed that the firm will increase the capacity of the Fulton, Mo., plant. Erection of an addition to the present facilities has been started, to house a tunnel kiln, a dryer, and related equipment.

Vancouver Industrial Group Plans Potash Development

A $25,000,000 potash development planned for the Melville area, 75 miles northeast of Regina, Saskatchewan, was recently announced by Robert Campbell, Vancouver industrialist.

Mr. Campbell, who heads a group which has already announced plans for a $60,000,000 pulp mill in the Prince Albert area, said potash withdrawal rights had been obtained for a 300,000-acre area.



LUBRIPLATE No. 630AA, the one lubricant that does the whole lubricating job on tools as well as on rigs. It has a high film strength with a melting point of 400°. It reduces friction, wear and power consumption to a minimum. It gives positive protection against rust and corrosion and the galling and seizing of tools. Avoid unnecessary shutdowns for repairs. Use LUBRIPLATE No. 630AA.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

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MAKES CARS AND TRUCKS RUN BETTER AND LAST LONGER

LUBRIPLATE H.D.S. MOTOR OIL . . . THE OIL THAT NEEDS NO ADDITIVES

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

New! More Compact!
GM DETROIT DIESEL

More Versatile!

300-H.P. SERIES 110 ENGINE

Now available to fit a broader range of power equipment

Now the best 300-horsepower Diesel is even better than ever—ready to step up production and cut costs on any job you name.

It's the time-proved General Motors Series 110 Diesel, newly equipped with a side-mounted blower similar to the one used on the famous 71 Series. It's a more compact engine. It's shorter. It's lower. It fits more applications than ever before.

You can have this new GM Detroit Diesel Series 110 engine installed in off-highway trucks and move bigger loads faster.

You can use it to increase the power of heavy crawler tractors, scrapers and air compressors—get more work per day and per dollar.

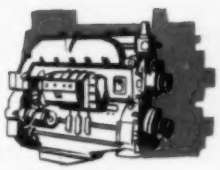
And, in practically no time at all, you can have this new Series 110 Diesel installed in almost any 3-yard shovel—to move earth faster at less cost.

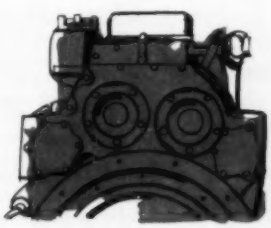
The new blower makes the Series 110 engine far more versatile—available with *either* right- or left-hand rotation, and a wider range of accessory drive outlets—*four* accessory drives on the rear of the engine, and *four* fan-mounting positions on the front.

This new Detroit Diesel Series 110 engine takes on all comers in operating efficiency. It's a leader in work output per dollar. Let your local GM Detroit Diesel Distributor or Dealer show you what we mean.

New Compactness—

The side-mounted blower eliminates former style blower at the end of the Series 110 engine and also cuts down height. Easier to install—easier to maintain.



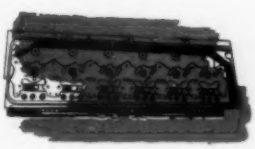


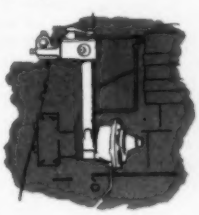
New Flexibility—

Four accessory drive outlets on rear of engine. You can direct drive both a hydraulic pump and an air compressor off the engine at the same time. New gear train features wider gears with increased helix angle for longer life. Blower and camshaft loads are split.

New long-life Cylinder Head

Has many design improvements, including integral water manifold and drilled passages for rocker-arm lubrication. Water manifold studs and gaskets eliminated. Outside rail gives extra rigidity.





New Governor

Is more easily serviced—utilizes many Series 71 parts. Provides for tachometer drive. An accessory drive may also be taken off the governor drive gear.

DETROIT DIESEL

Engine Division of General Motors, Detroit 28, Michigan

Single Engines . . . 30 to 300 H.P. Multiple Units . . . Up to 893 H.P.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario

AMERICA'S LARGEST BUILDER OF DIESEL ENGINES

Record 1956 Construction Estimated at $44.5 Billion By Labor, Commerce Dept

Outlays for new construction are expected to total $44,500,000,000 in 1956, 4 percent above last year's record of $43,000,000,000, according to revised outlook estimates prepared jointly by the Departments of Labor and Commerce.

These revised estimates reflect very little change in total construction activity from the $44,000,000,000 level projected for 1956 by these agencies last November. Present indications are that, compared with earlier expectations, new housing will decline more, but utilities, private industrial buildings, and highways, will show greater gains.

After allowances for seasonal changes, construction expenditures during May rose to an annual rate of $43,600,000,000. This compares with an annual rate of $43,100,000,000 during January, 1956, and actual outlays of $43,000,000,000 in 1955.

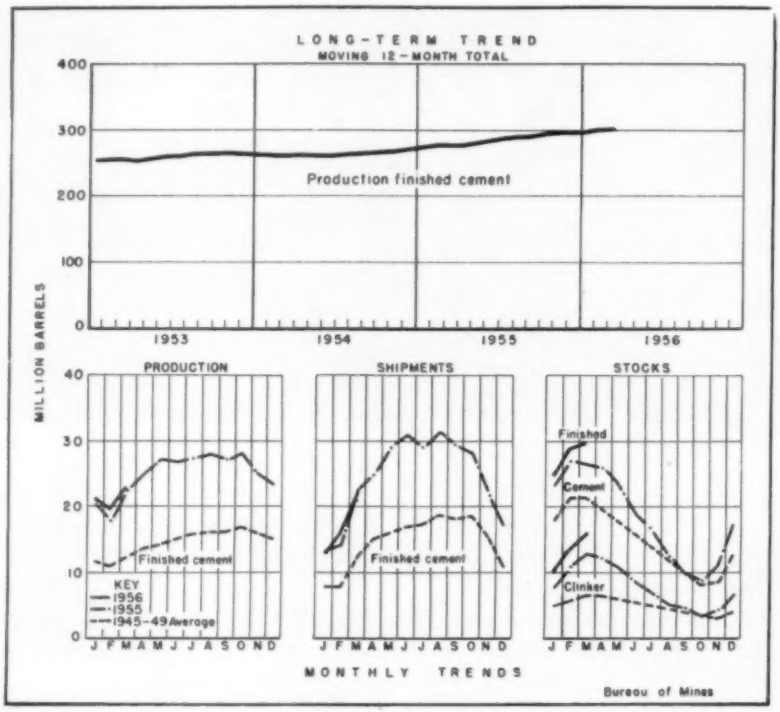
The present outlook for construction assumes that the current high level of overall economic activity will remain relatively stable, and that disposable income of consumers will continue at record levels. Nationwide, supplies of building materials should be adequate, with increased plant capacity and high productivity preventing all but minor or spot shortages. Construction costs are expected to continue to rise moderately.

Prospects are that private construction outlays in 1956 will total about the same as in 1955—$31,000,000,000. Public spending for new construction is expected to advance 9 percent to $13,500,000,000.

It now appears that about 1,150,000 new private nonfarm dwelling units will be started this year. This compares with an earlier estimate of 1,200,000 for 1956, and a 1955 total of 1,310,000.

The decline in new homebuilding is expected to be greater than previously anticipated because funds for long-term, low down-payment mortgages at low interest rates, have remained relatively scarce for a longer period than was foreseen last November.

However, increased outlays for highways, private industrial plants, utilities, and commercial buildings will probably more than offset the decrease in new housing activity. Expenditures for each of these nonresidential categories are expected to reach a new record volume in 1956.



SUMMARY—Production of finished portland cement in March, 1956, as reported to the Bureau of Mines, U. S. Department of the Interior, totaled 23,386,000 barrels, an increase of 5 percent over March, 1955. Mill shipments in March, 1956, totaled 22,222,000 barrels, a decrease of 2 percent compared with March, 1955. Stocks of 29,854,000 barrels of finished portland cement on hand March 31, 1956, were 13 percent more than on the same date last year. Clinker production during March, 1956, totaled 25,811,000 barrels—an increase of 6 percent over the March, 1955, figure.

PRODUCTION—One hundred and fifty-seven (157) plants in 37 states and Puerto Rico reported a production of 23,386,000 barrels of finished portland cement during March, 1956, compared with 22,340,000 barrels in March, 1955.

Clinker production during the month of March, 1956, was 25,811,000 barrels compared with 24,318,000 barrels during the same month last year.

Clinker figures for 1955 and 1956 are not strictly comparable to those of 1954 and earlier years because producers are now asked to report clinker in terms of the number of 376-lb. barrels of finished portland cement that could be produced from the quantity of clinker in question, whereas previously the unit of measure was the 376-lb. barrel of clinker.

Production of high-early-strength portland cement in March, 1956, totaled 1,053,000 barrels, an increase of 6 percent over the March, 1955, production of 995,000 barrels.

SHIPMENTS—Mill shipments of finished portland cement were 2 percent less in March, 1956, than in March, 1955, and totaled 22,222,000 barrels. The figures for mill shipments in 1955 and 1956 are not strictly comparable with mill shipments of 1954 and earlier years because they no longer include the number of barrels of finished portland cement used in the manufacture of prepared masonry cement.

Shipments in March, 1956, were higher in 10 districts and lower in 10 than in March, 1955. The greatest increases were registered in the southern California and Michigan districts. The greatest decreases were in the western Missouri-Nebraska-Oklahoma, Arkansas, New York-Maine, eastern Pennsylvania-Maryland, and Illinois districts.

Mill shipments of high-early-strength portland cement in March, 1956, totaled 915,000 barrels, a decrease of 7 percent compared with March, 1955. As usual, nearly half of these shipments were from mills in the eastern Pennsylvania-Maryland, and Michigan districts.

STOCKS—Mill stocks of 29,854,000 barrels of finished portland cement were on hand March 31, 1956, an increase of 13 percent more than the 26,516,000 barrels on hand March 31, 1955. Stocks of clinker increased 27 percent from 12,629,000 barrels on March 31, 1955, to 16,026,000 barrels on March 31, 1956.

European Mining Operations Visited by Plant Officials

A. J. Cayia Sr., president of the Inland Lime and Stone Company, Escanaba, Mich., and president and general manager of the Caland Ore Company, Ltd., Atikokan, Ont., recently returned from a month's tour of European mining operations. P. P. Ribotto, chief engineer for Inland Steel Company at Ishpeming, and P. D. Pearson, manager, Caland Ore Co., accompanied Mr. Cayia on the trip.

The itinerary included a short tour of England's mines, and a visit to operations in northern Sweden, Germany, and France.

5 "Euc" REAR-DUMPS

10 to 50 Ton Capacities

for CONSTRUCTION, MINE, QUARRY and INDUSTRIAL WORK

10-Ton

Model UD has 128 h.p. engine . . . 10-speed transmission . . . 36 m.p.h. loaded travel speed . . . spring mounted drive axle with 12.00 x 24 duals.

Euclid Rear-Dump hauling units for off-highway service are available in five sizes with capacities of 10, 15, 22, 34 and 50 tons. They have diesel engines of 128 to 600 total horsepower.

The simple rugged construction of "Eucs" pays off in long life and low maintenance cost. You get more work-ability because there's less down time for repairs. There are more Rear-Dump "Eucs" in service than all other makes of off-highway haulers combined.

Have your Euclid Dealer give you facts and figures on the complete line of Rear-Dumps and other Euclid equipment . . . you may find, as hundreds of owners have found, that ***Euclids are your best investment.***

EUCLID DIVISION, GENERAL MOTORS, Cleveland 17, Ohio

15-Ton

There are two 15-Ton models with 5-speed transmission and 14.00 x 24 tires. Model FD has 165 h.p. engine, and 10 cu. yd. body. Model R-15 has 218 h.p. engine, spring mounted drive axle, power steering and 10½ cu. yd. body. Quarry body is available for either model.

22-Ton

Model TD "Euc" is equipped with 300 h.p. engine, spring mounted drive axle with 18.00 x 25 duals, power steering and 15 yd. body. Available with Torqmatic Drive or 10-speed transmission. Standard or quarry body is available.

34-Ton

Model FFD has two engines providing a total of 400 or 436 h.p. to tandem drive axles through separate Torqmatic Drives. Dual tires are 16.00 x 25. Exhaust heated body has 24-yd. capacity.

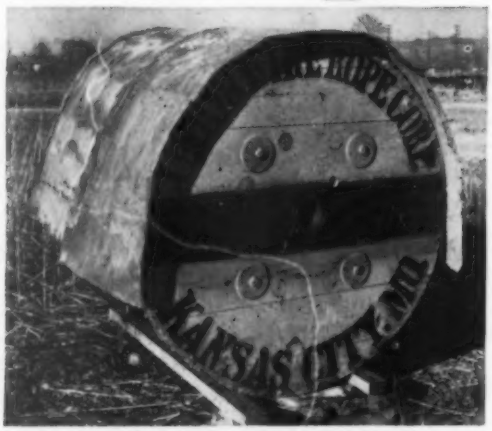
50-Ton

Similar in design to the Model FFD "Euc", the 50-ton Twin-Power Model LLD has a total of 600 h.p. and an exhaust heated body with 32-yd. capacity. Tires are 18.00 x 33.

Euclid Equipment

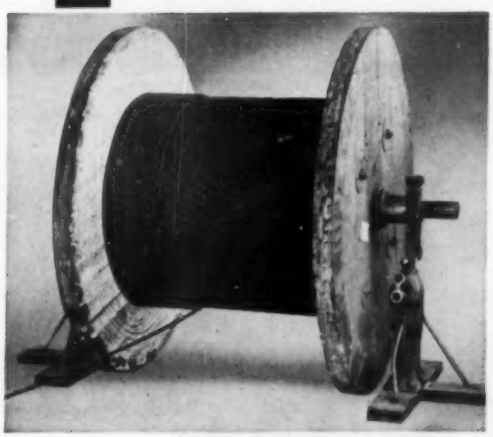
FOR MOVING EARTH, ROCK, COAL AND ORE

Tuffy Tips



Store Rope Like This

Keep spare rope in a dry, sheltered place free of dust, vapors or fume-laden air. If stored out of doors, set reel on blocks off the ground. Clear away weeds and grass and protect with a waterproof covering as shown. Check each month for rust caused by moisture collecting on the rope. Paint with a heavy crankcase or cylinder oil if rust is discovered or even before it shows up if moisture is present.



Unwind Like This

When getting ready to install the rope, special care should be taken to see that the reel is set up for smooth, easy unreeling. Set reel up on jacks as shown above and unreel so the rope pulls off from the bottom of the reel—*not* from the top. Coils should be put on a swift or rolled on the ground to pay off the rope. Kinks or "doglegs" may result from incorrect unreeling, seriously damaging wires of the rope and greatly reducing the ultimate life.

Research Adds Factual Data On Sheave Sizes

Until recently determination of sheave sizes has been by rule of thumb, experience and meager factual data. The influence of variables in operating conditions on rope life must still be determined by experience.

Insofar as bending stresses alone would be the primary cause of rope failure, exhaustive bending tests have established factual data giving a better guide than the former fixed sheave diameter and construction ratio tables.

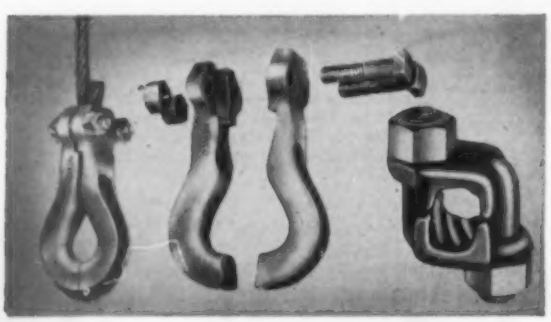
These tests were conducted under the auspices of the Wire Rope Technical Board and the American Petroleum Institute.

From the experimental data this developed, the following table on sheave diameter factors is introduced as a preliminary guide in selecting the proper sheave size. It lists the general purpose range on the more commonly used rope constructions based primarily upon bending stresses. If it becomes expedient to go either above or below the general range, plotted curves will be supplied by Union Wire Rope engineers for determining the change in service life due to bending fatigue.

SHEAVE DIAMETER FACTORS

Rope Construction	Higher Range	General Purpose Range D/d Ratios		Lower Range
6x7	For example: Shaft hoists would require higher values	63	42	For example: Truck winch would require lower values
18x7		54	36	
6x17 Seale		49	33	
6x19 Seale		45	30	
6x21 Filler Wire		39	26	
6x25 Filler Wire		36	24	
6x31		33	22	
8x19 Seale		31	21	
6x37		27	18	
8x19 Warrington		27	18	
Tiller Rope		18	12	

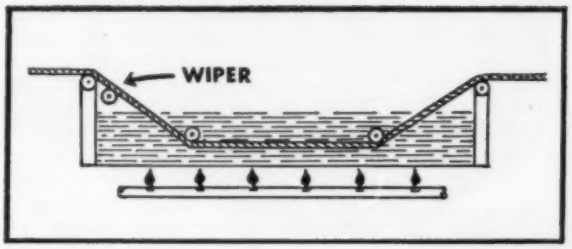
To determine sheave diameter multiply higher or lower range values above by the rope diameter.

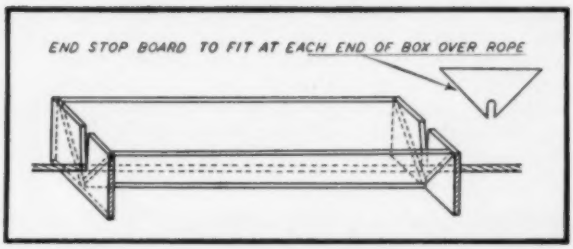


Attach By Clipping

The fittings you use on wire rope can handicap it or enable it to work at full efficiency. Fittings which derive holding power by crimping action are harmful to the rope. Shown here are two rope clamps. One is a combination clamp and thimble. Both provide snug saddling of the rope and grip larger and uncrimped bearing surfaces so tightly that the loads are carried almost solely by the force of friction.

To More Than Break Even In Service Life Give Your WIRE ROPE An Even Break

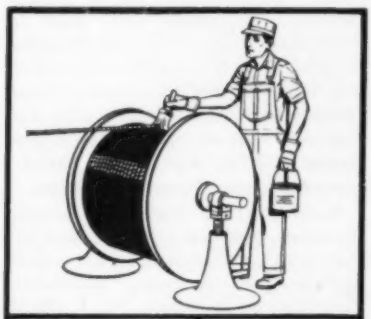


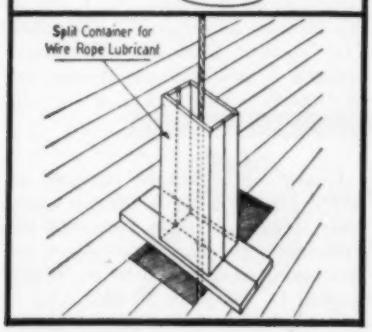


Rope That Is Stored for long periods of time should be lubricated during installation. If it is not possible to lubricate stored rope very often, apply a sealing compound to hold the lubricant that is already present.

Rope In Use can be lubricated most economically without removing it from the equipment on which it is operated. Lubricate rope as often as it needs it—service conditions determine the frequency.

Use Lubricant Hot or Cold, depending on its penetrating qualities. Your local oil company engineer will be able to recommend an oil that will actually penetrate to the working parts of the rope, and not just form a coating that peels off the first time your rope runs through a sheave.





Specifications? – say Tuffy

Tuffy Scraper Rope

Mount a reel on your scraper and move more yardage per foot. Flexible to resist sharp bends, stiff enough to resist looping and kinking.

Tuffy Slings & Hoist Line

A hoist line that gives you extra service life. Slings of 9-part machine braided wire fabric fight kinking — a matched team of balanced performers.

Tuffy Dragline

Rides smooth on drums and hugs the drum when casting. Extra flexible, yet constructed to give maximum abrasive resistance.

Tuffy Dozer Rope

Mounted on special 150′ reel that lets you use rope you now throw away! Increases service life and reduces down-time. 1/2″ and 9/16″.

Your Union Wire Rope Distributor Is Good At Solving

Wire Rope **Riddles.** When you have a wire rope problem, give your Union Wire Rope distributor a call for hurry-up service. Chances are you'll find he has the correct answer at hand—because part of his job is figuring out how your equipment can give you the best operation, at the lowest operating cost! Feel free to call on him anytime.

union *Wire Rope* **corp.**

2132 Manchester Avenue, Kansas City 26, Mo.

3
Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

DWIGHT-LLOYD DIV. LABORATORY HOUSED IN NEW BUILDING

One of the largest and most complete mineral processing laboratories of its type in the United States is now in full operation at the Dwight-Lloyd Division of McDowell Company, Inc., Cleveland, Ohio. Long known as the Dwight-Lloyd Research Laboratory, its enlarged facilities and staff are available to McDowell clients in the basic industries who lack capacity for developing engineering data covering size enlargement techniques in such materials fields as raw cement meal, clays and shales, coal wastes, limestone, flyash, other nonmetallics, and also iron ore, iron ore concentrates, and other metallic ores.

Dating back to 1904, the Dwight-Lloyd Research Laboratory grew from the work of two metallurgists, Col. A. S. Dwight and R. L. Lloyd, who moved the equipment with them, working at various university laboratories and at mines and smelters. In 1921, the laboratory was established at Netcong, N. J. There it continued to operate in both the ferrous and non-ferrous fields until its transfer to Cleveland.

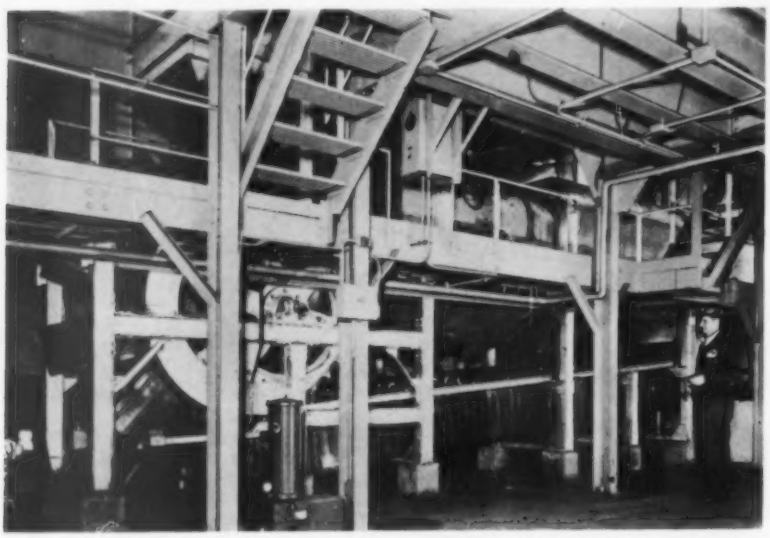
The new Dwight-Lloyd Research Laboratory is housed in a modern building at 16300 Waterloo Road, on Cleveland's east side. Its facilities, which are already being used to capacity, are for both unit processes and operations. Equipment permits crushing, sizing and screening, pelletizing, heat-hardening of pellets, sintering, blending of materials, strength analysis of processed minerals, drying and calcining.

McDowell Company, Inc., was organized in 1944 in Cleveland as an engineering and contracting organization specializing in the turnkey design, construction, and installation of mechanical plants for basic industry from procurement of raw materials through finished product. Highway and railroad bridges, dockside facilities, and the like, also figure as specialties.

In 1954 the McDowell Company decided to enter the manufacture of some of the various types of products and equipment used in basic minerals processing. In 1954 the Wellman Engineering Company was acquired. Thus McDowell obtained a comprehensive line of bulk-materials-handling systems, heavy hoisting equipment, steelmaking machinery, and industrial gas producers.

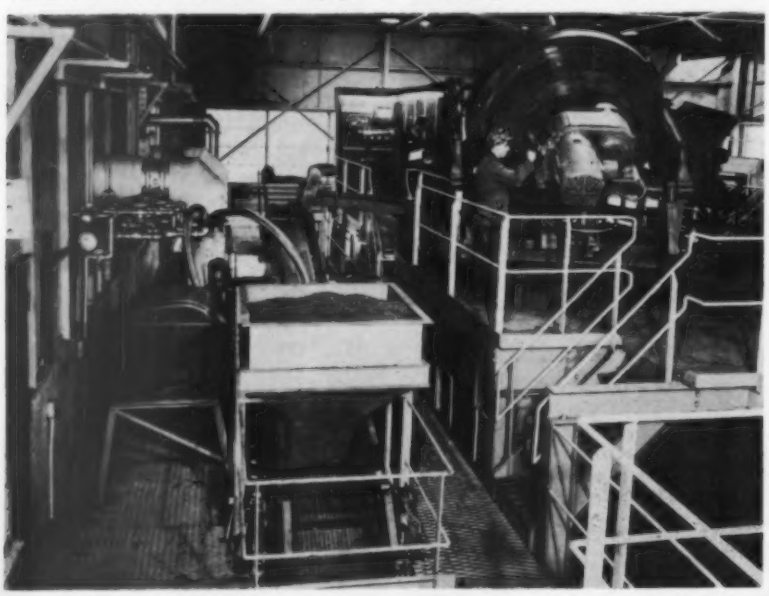
The Wellman group includes the following: the Williams Bucket Division, Akron, Ohio, which manufactures a complete size range of contractors' clamshell and dragline buckets, as well as engineered industrial buckets; the Locomotive Crane Division, successor to Browning Locomotive Crane; and the Anker-Holth Division, Port Huron, Mich., manufacturers of power cylinders.

Early in 1955 McDowell bought the assets, business, goodwill, and the then-existing Dwight-Lloyd research facilities of Sintering Machinery Corporation, Netcong, N. J. With this business it acquired ABC scales. The former Sintering Machinery business is now integrated into the McDowell organization as its Dwight-Lloyd Division.



One section of the Dwight-Lloyd traveling grate, seen from the drive end, showing the process of separating the pellets.

This illustration shows the actual charging of the traveling grate with raw pellets.



Charles E. Nichols, director of safety, Fischer Lime & Cement Company, Memphis, Tenn., attended the President's personal conference on occupational safety, held in Washington, D. C., May 16-18.

For severe operating conditions in rotary kilns . . .

Harbison-Walker ALUSITE

This leading brand of 70% alumina refractory owes its extremely wide use for rotary kiln linings to its unusual combination of desirable properties. Its high density and low permeability account for its excellent resistance to penetration, such as promotes fluxing. ALUSITE is strong and highly resistant to mechanical stresses, abrasion and thermal shock.

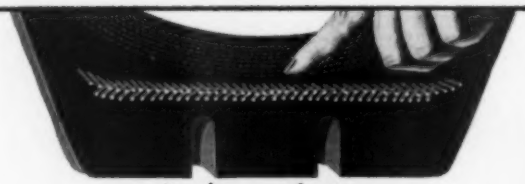
Rigid quality control in the manufacture of ALUSITE assures the maintenance of the proper chemical and mineral composition and the constancy of its measured physical properties. The close size tolerance and excellent workmanship of ALUSITE radial blocks, arches and wedges make for easy, close fitting linings.

ALUSITE excels in its use in high temperature zones of rotary kilns or in the zones beyond the basic refractory linings where such are needed. It is equally favored for linings of kilns used for burning cement, lime, dolomite, magnesite and other minerals requiring high temperature treatment.

ALUSITE is now available from modern plants in Pennsylvania and Missouri.

HARBISON-WALKER REFRACTORIES CO.
AND SUBSIDIARIES *World's Most Complete Refractories Service*
GENERAL OFFICES: PITTSBURGH 22, PENNSYLVANIA

Announcing—

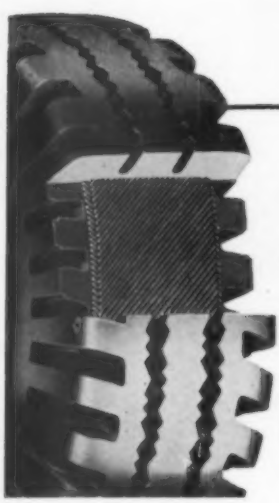


Look—exclusive

SAFETY STEEL SHIELD*

Right here, between tread and Super Royalon body, are thousands of cords of flexible *steel*. They form a Safety Shield invulnerable to ruptures and cuts in the vital tread area—not only for original tread life but for extra recap life as well!

NEW U.S. ROYAL



Additional Engineering Advances that save you money in the new Super Fleetmaster

- ★ New Cross-Braced Grooves—arrest cut growth
- ★ New Tri-Rib Tread—for increased stability, easier handling
- ★ New Multi-Edged Design—gives greater highway skid control
- ★ New, Deeper Shoulder Vents—dispel heat for cooler running
- ★ New Chemi-Balanced Tread Compound—resists cutting, chipping
- ★ New Wide-Angle Grooves—actually roll away from stones

AN ALL-NEW, ALL-WHEEL ON-AND-OFF-THE-ROAD TIRE

Invulnerable

to cuts and ruptures in the vital tread area!

You are looking at an entirely new kind of truck tire—the new U. S. Royal Super Fleetmaster. Its exclusive Safety Steel Shield makes it so immune to road hazards that it runs over spikes and razor-sharp axblades without losing a pound of air!

Put the new Super Fleetmaster on any wheel and watch it outperform! On front wheels, it gives greater stability. On drive wheels, it delivers extra traction. On trailing wheels, it lasts for recap after recap. *Standardize* on this great new tire—and reduce inventory expense!

Super FLEETMASTER

SAFETY STEEL SHIELD*

Mount this great new tire on dump trucks, transit mixers, log haulers... on any wheel exposed to heavy impacts, sharp objects, murderous terrain. You'll enjoy fewer tire failures, less downtime expense and greater service dependability.

Right now, your U. S. Royal Dealer has the new Super Fleetmaster with exclusive Safety Steel Shield in sizes through 11.00. See him—as soon as you can. And remember, you can specify "Super Fleetmaster" on your new equipment!

*Patent Applied For

For further information write, Truck Tire Department

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NOW! The lowest-priced

Miles of extra life, with extra-strong chassis features! Up to 3000 lbs. more payload than other 6-wheelers!

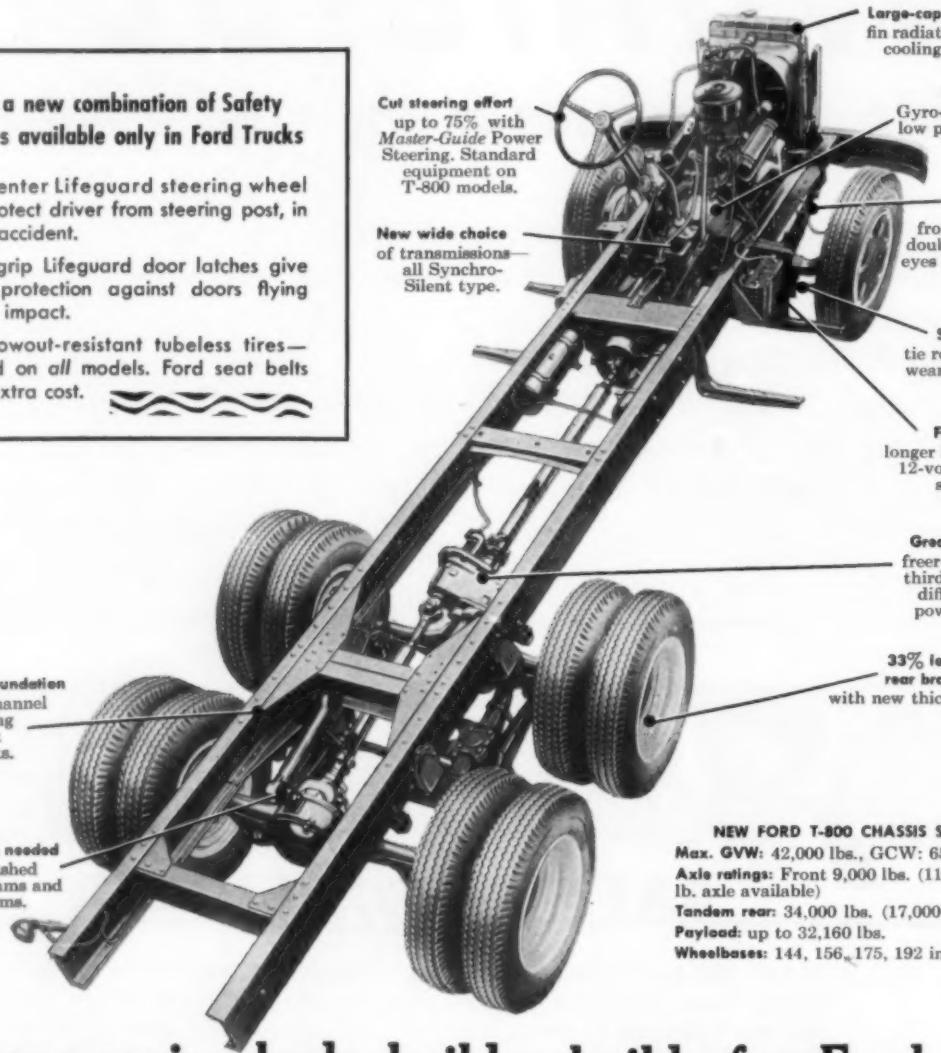
• Ford's new T-800 is the lowest-priced in its class—based on a comparison of manufacturers' suggested list prices. It also carries up to 3000 more lbs. of payload compared to other tandems *in the same GVW weight class!*

With a new combination of Safety Features available only in Ford Trucks

Deep-center Lifeguard steering wheel helps protect driver from steering post, in case of accident.

Double-grip Lifeguard door latches give added protection against doors flying open on impact.

New blowout-resistant tubeless tires—standard on *all* models. Ford seat belts at low extra cost.



Large-capacity flat tube fin radiator gives high cooling efficiency.

Long lasting Gyro-Grip clutch with low pedal pressure.

Easy-action front springs with double-wrapped rear eyes for added safety.

Spring-loaded tie rod ends take up wear automatically.

Faster starts, longer life with new 12-volt electrical system.

Greater economy, freer rolling, from third (inter-axle) differential in power divider.

33% longer rear brake life with new thicker linings.

Cut steering effort up to 75% with *Master-Guide* Power Steering. Standard equipment on T-800 models.

New wide choice of transmissions—all Synchro-Silent type.

Rugged truck foundation from deep-channel frames, among the strongest on any trucks.

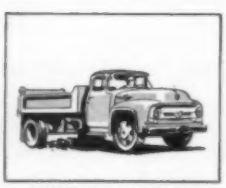
No lubrication needed —rubber-bushed equalizing beams and torque arms.

NEW FORD T-800 CHASSIS SHOWN
Max. GVW: 42,000 lbs., GCW: 65,000 lbs.
Axle ratings: Front 9,000 lbs. (11,000 lb. axle available)
Tandem rear: 34,000 lbs. (17,000 each axle)
Payload: up to 32,160 lbs.
Wheelbases: 144, 156, 175, 192 inches.

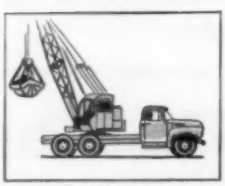
Every major body builder builds for Ford . . .

CEMENT MIXER TRUCK

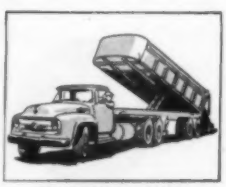
DUMP TRUCK



DUMP WITH SCRAPER



TRUCK-MOUNTED CRANE

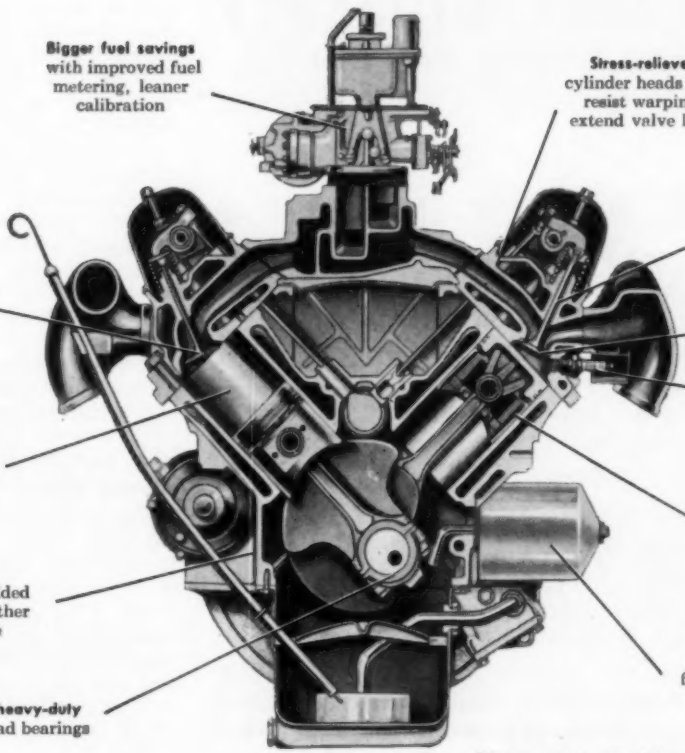


TRAILERIZED DUMP

Tandem in its class-Ford T-800

Longer-lived, dependable operation with exclusive heavy-duty engine features

• '56 Ford Tandems offer you the most proven Short Stroke V-8 engines in the industry—*for better gas mileage, longer life, less maintenance costs.* And you get a combination of longer-lasting heavy-duty engine advancements found in no other truck. Ask your Ford Dealer for details.



Bigger fuel savings with improved fuel metering, leaner calibration

Stress-relieved cylinder heads that resist warping, extend valve life*

225° cooler valves —new sodium-cooled exhaust valves with tungsten-cobalt facing*

Self-Sealing dish-type intake valves for tighter fit*

Durable, self-cleaning free-turn valves

Anti-fouling 18-mm. spark plugs with new long-life electrodes

Short Stroke design in *every* engine for greater gas savings, longer life

Expansion-controlled pistons with integral steel struts

Deep-block structure for added strength, smoother performance

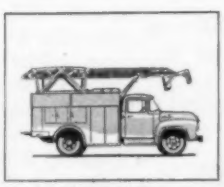
Full-flow oil filter to clean *all* the oil for longer engine life

Durable heavy-duty copper-lead bearings

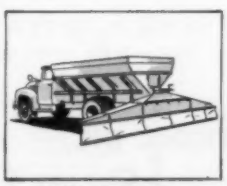
***Features of new Ford Heavy Duty engines . . .** 190-h.p. *Torque King* V-8 shown . . . 200-h.p. *Torque King Special* V-8 available.

More fleets are buying Fords than any other make

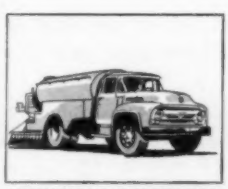
UTILITY TRUCK



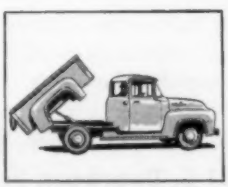
LINE TRUCK



LIME SPREADER



BITUMINOUS DISTRIBUTOR



LIGHT DUTY DUMP

Myers Named President Of Zonolite Company— Other Promotions Noted

John B. Myers was elected president of the Zonolite Company, Chicago, at a recent meeting of the board of directors.

Formerly vice-president in charge of mining and production, Mr. Myers succeeds A. T. Kearney, who continues as board chairman. Mr. Kearney, a pioneer in the vermiculite industry, has been president since the merger of Universal Insulation and Zonolite companies in 1939. He has served in the dual capacity of president and chairman since 1954.

Mr. Myers joined Zonolite in 1934 following research for that company at its Miner Laboratory in Chicago, and is credited with modernizing Zonolite mining and processing operations. He was elected vice-president in 1944 and a board member in 1946.

J. A. Kelley, vice-president of the southern division, became executive vice-president of mining and production, taking over the duties formerly assigned to Mr. Myers. He is a mining engineering graduate of the University of Pittsburgh and formerly served the U. S. Bureau of Mines and the War Production Board.

J. B. Myers

R. W. Sterrett, vice-president, concrete products division, has been named vice-president and general sales manager. Mr. Sterrett was formerly president of a subsidiary, the Southern Zonolite Company.

D. L. Prouty, formerly a divisional vice-president, has been appointed vice-president in charge of market research. Mr. Prouty has been with the company since its inception.

Merchandising, advertising, and sales promotion will be under the direction of D. J. Boone, vice-president.

Zonolite operates mines in Libby, Mont., and Travelers Rest, S. C., and processing plants in 20 states.

E. D. Hallock Jr. Elected Albany Asphalt President

Eugene D. Hallock Jr. has been elected president of Albany Asphalt & Aggregates Corporation, Albany, N. Y., succeeding Paul E. O'Meara.

Mr. O'Meara, president of the firm since it began operations at the Port of Albany in 1948, has resigned and sold his interest. The company now is a subsidiary of the Hudson River Construction Company, Inc.

Mr. Hallock, formerly vice-president, has been with Albany Asphalt since its founding. Succeeding him as vice-president and director is Homer Peters.

Organization of Lake Ontario Portland Cement Company, Ltd., has been announced at Picton, Ont. This new concern plans to construct and operate a cement plant designed for an initial annual capacity of 1,650,000 bbl. of cement and 600,000 tons of aggregates. The facility will cost approximately $16,500,000. William A. Fraser, Trenton, Ont., is president of the company.

Cement Plant Glossary

Another PIT AND QUARRY Exclusive!

This 19 page booklet lists and defines colloquialisms, technical and operational terms most frequently used in cement plants throughout the United States and Canada. It is published exclusively by Pit and Quarry and is available to you at the very nominal price of 25 cents a copy.

This informative glossary was compiled by Mr. C. F. Clausen and Mr. W. R. Dersnah of the Portland Cement Association. Their main reason for creating it was to standardize cement plant terminology and define it so that it could be understood by any person who had occasion to come into contact with the cement industry, either directly or indirectly.

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Dolomite Depletion Rate Under 1951-53 Statute Set by U. S. Tax Court

A legal decision concerning percentage depletion rates, which has been long awaited by many quarry operators, was handed down last month by the United States Tax Court judge who tried the Virginian Limestone Corporation case.

Specifically, this litigation involved the question of whether, under the 1951 depletion statute, a dolomite producer was entitled to a 10 percent depletion rate on gross sales of all material sold, or whether the end use was determinative of the applicable rate, *i.e.*, 5 percent if sold as aggregates.

In the Tax Court decision, it is stated that congressional intent was to grant dolomite a 10 percent rate in the 1951 statute (which was in effect through 1953), and that the end use test should not be applied. This point is clarified in the 1954 law.

Dolomite producers who still have 1951 and 1952 tax returns under active examination, or a settlement date resulting from such examination within the last two years, may take advantage of this decision by filing the Treasury Department-Internal Revenue Service Form No. 843 (claim for refund or abatement). Since the statute of limitations has not yet expired on 1953, the above procedure is automatically available.

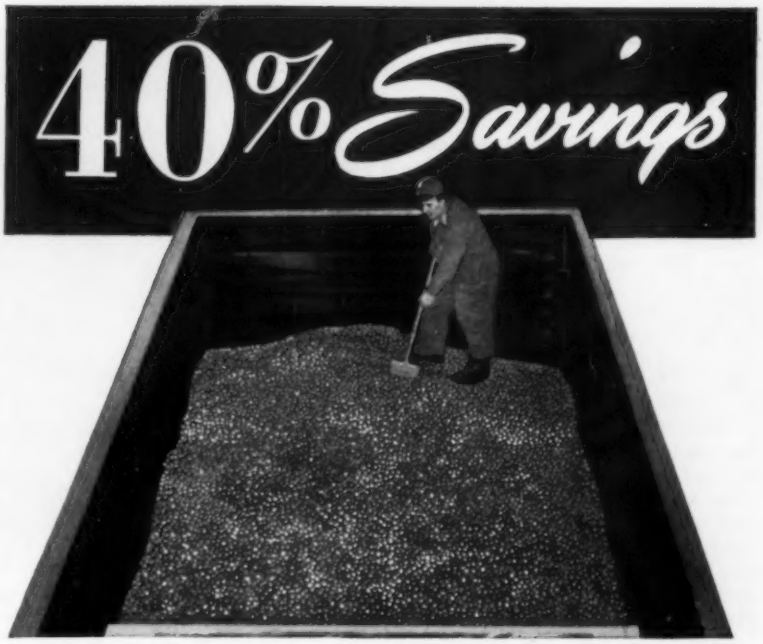
Form No. 843 should be filed with the district director's office where assessments were made upon, and taxes paid by, those producers involved.

C. D. Smith II New President Of Memphis Stone & Gravel

Officials of the Memphis Stone & Gravel Company, Memphis, Tenn., have named Charles D. Smith II, a former Naval officer, president of the firm, succeeding Jesse S. Cooper, who has headed the concern since 1948.

Mr. Cooper was elected chairman of the board and general manager of the company. At the same time Thomas Salmon, Houston, Miss., and George S. Gee, Jackson, Tenn., were named vice-presidents.

Mr. Smith, who was a junior officer aboard the cruiser *U.S.S. Houston* when she was sunk in February, 1942, in the Java Sea, was taken prisoner by the Japanese and spent three years in captivity. He joined Memphis Stone & Gravel Co. ten years ago. In addition to his duties as president of the firm, Mr. Smith retains his post as treasurer.



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Calumet Ni-Hard grinding balls are available from stock in the following sizes: 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2" and 2". Complete information is yours for the asking. Write TODAY.

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Lake Asbestos of Quebec To Build $7,700,000 Facility At Black Lake Location

A $7,700,000 contract for construction of an asbestos ore milling plant, with a capacity of 5,000 tons of ore per day, has been let to the F. H. McGraw Company of Canada, Ltd., by Lake Asbestos of Quebec, Ltd. This announcement was released by R. D. Bradford, president of Lake Asbestos, a wholly-owned Canadian subsidiary of the American Smelting and Refining Company. The facility will be located on the shores of Black Lake.

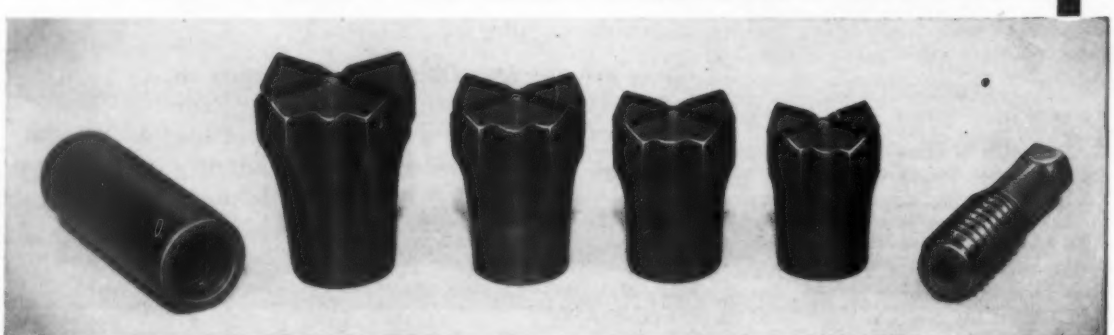
Work will start immediately on the plant, which is expected to be finished in the early spring of 1958. Altogether, more than $9,000,000 will be spent for the structure and machinery. Approximately 100,000 tons of asbestos fiber will be produced annually at the Lake Asbestos plant.

Asbestos ore will come from bodies which now lie 70 to 200 ft. beneath the waters of Black Lake, 75 miles south of Quebec City and 130 miles east northeast of Montreal. This lake with its silt, clay, and water is now being dredged at the rate of about 1,000,000 cu. yd. of solids each month. More than 10,000,000 cu. yd. of solids have been removed.

When the overlying water and solids have been dredged from the Black Lake site, the asbestos ore will be mined by the open-pit method. Approximately 350 persons will be employed in the Lake Asbestos of Quebec operation when it is in full swing. American Smelting and Refining Company expects to spend over $32,000,000 to develop the mine.

The 30-in. suction dredge on Black Lake, Que., site of a $7,700,000 asbestos processing plant which will be built by Lake Asbestos of Quebec, Ltd.

BRUNNER & LAY "600" ROK-BITS



"600" Coupling | 3½-in. Rok-Bit | 3-in. Rok-Bit | 2¾-in. Rok-Bit | 2½-in. Rok-Bit | G-D "600" Thread

Brunner & Lay "600" carbide Rok-Bits® designed to fit directly on "600" series extension drill rods. No adapter needed! Rok-Bits' "X" design eliminates rifling, gives you a ROUND hole to load. Wider chip channels permit discharge of more and larger chips. Order from your distributor—if he cannot supply you, contact our nearest plant. Write for Bulletin!

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It will pay you to LEAP *into this profitable new business...*

"LIGHTWEIGHT AGGREGATE"

...but LOOK first

HERE'S WHAT YOU SHOULD KNOW!

There are hundreds of different types of clays and shales—all with different bloating characteristics.

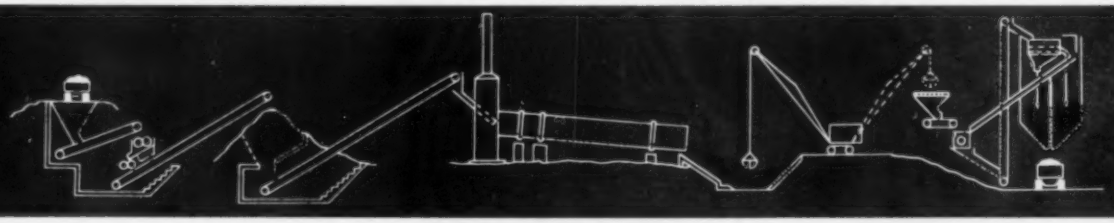
The selection of the process for preparing lightweight aggregate of the proper characteristics and size is determined by the raw material and must be made with care. McNally Pittsburg researchers, designers, and engineers have conducted a careful study of the best processing methods, and the design and construction of plants and equipment for the profitable manufacture and processing of lightweight aggregates in all parts of the country.

Last year there wasn't enough lightweight aggregate to "go around."

America's greatest Building Boom is just getting under way—and no end in sight for at least 10 years.

Builders and architects are fast turning to concrete and blocks made with lightweight aggregate!

That's why the wise operators are saying, "Let's get into a new business,'LIGHTWEIGHT AGGREGATE.'"



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Desired capacity of plant per day is _____.

Shale ☐ Clay ☐

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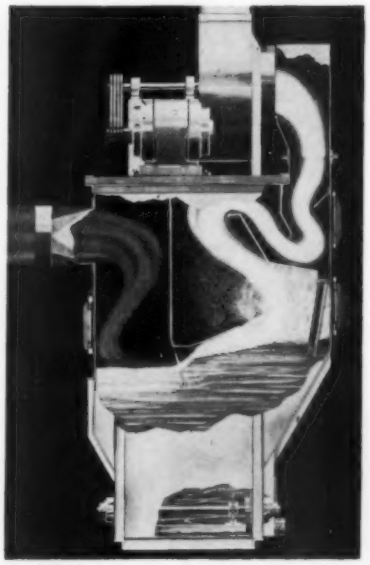
New Machinery and Equipment

(For More Information Use Card on Page 205)

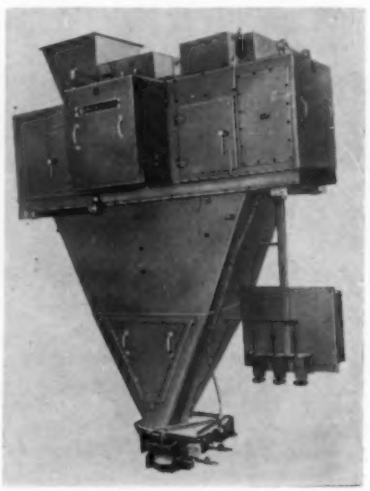
● The hydraulic D4 backhoe has been designed by the Hyster Company for use with the Caterpillar D4 tractor. The new ½-cu. yd. capacity backhoe has full track-type tractor mobility, and is capable of digging down to 13 ft. and loading up to a height of 9 ft. 7½ in. A rack and gear swing mechanism, operating in an oil-tight case, provides full swing power at uniform speed throughout a 240 deg. arc. Retractable hydraulic outriggers provide complete machine stability. (51)

● A new and simple system for keeping wire rope service records is offered by Leschen Wire Rope Division, H. K. Porter Company, Inc. It is designed to increase wire rope operating efficiency and to help reduce supply and maintenance costs. The Leschen Service-Score Sticker is applied to a convenient place on the equipment. It has space to record wire rope information for comparative service data and for ordering replacement lines. (52)

● The latest addition to the Cummins line of Turbodiesel engines is the NRTO-6. This 335-hp. engine is said to develop 67½ percent more power than a naturally aspirated engine of the same size. The high output of the NRTO-6 is possible through the development of the Cummins T-590 Turbocharger, used in combination with the Cummins PT fuel system. The Turbodiesel functions on all commercially acceptable diesel fuel weights. (53)



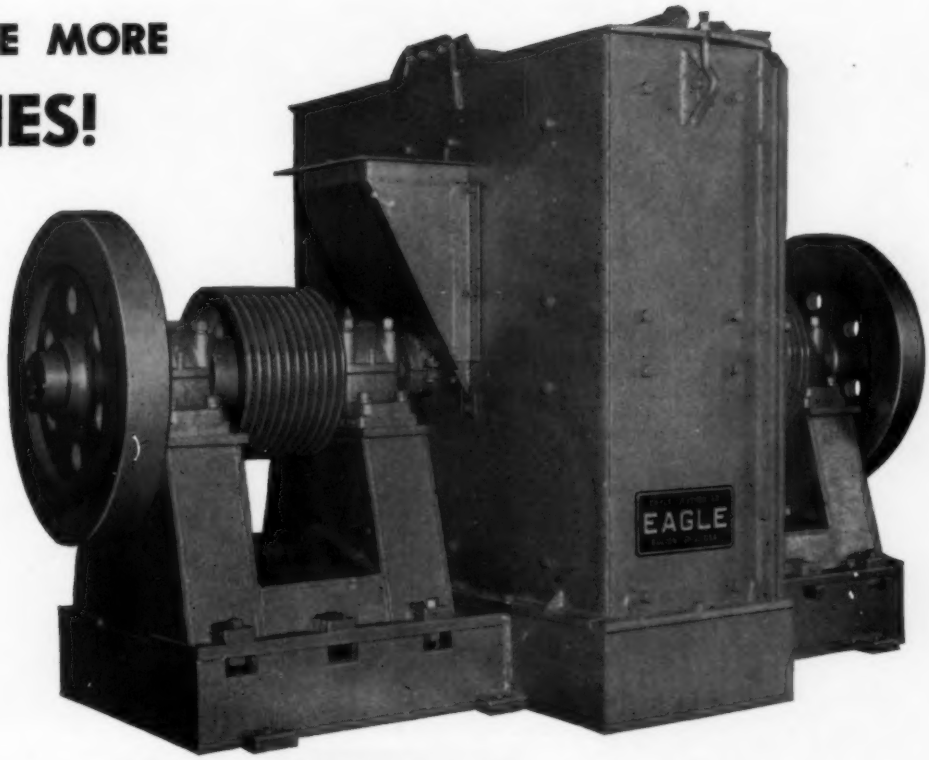
● Dust laden air enters Pangborn's "Ventrijet" collector and expands in the inlet chamber at reduced velocity. Air is drawn through venturi tubes into the discharge chamber. The low pressure area in the venturi throat also induces water to enter the high velocity air stream. The mixing of air and water causes the transfer of dust particles from the air to the water particles. The air, water, and sludge mixture impinges at high velocity on special surfaces in the discharge chamber. Sludge settles to the tank bottom. The washed air then flows through an eliminator section for removal of droplets. Clear air is discharged. (54)



● A high-speed automatic bagging scale that accurately proportions and bags ten or more sacks of dry aggregate ingredients per minute has been developed by the Richardson Scale Company. Called the Richardson "Weighblender", the unit consists of a series of three scales mounted in a sturdy base frame, with the bagging hopper beneath arranged to receive ingredients simultaneously from all three scales. This permits blending of the ingredients as they enter the bag. The scale is particularly useful in the dry-mix concrete market where dry ingredients are weighed and bagged for sale to the user who has only to add water to make concrete. (55)

PRODUCE MORE

FINES!



WITH OUR *NEW* LINE OF

4-CAGE DISINTEGRATING MILLS

For reduction of limestone, fertilizing compounds, slag, pre-crushed stone, clay, low silica gravel, etc.

Hard-facing of pins and side walls is among the features of this Eagle Disintegrator, latest addition to a nearly 25-year old, distinguished family of pulverizers, crushers, and related equipment.

Capacities range from approximately 10 tons per hour on Model 3 to approximately 55 tons per hour on Model 5—three models in all.

One-piece frame, electrically welded, assures exceptional strength and stability. High quality, SKF or Torrington, taper-bore bearings, spherical roller type, permit takeup due to wear—an exclusive Eagle feature!

Quickest access—when occasion demands it, you can get at and into this Eagle faster than into any comparable model. Remove pin to raise hinged lid, then 6 bolts to remove access side plate —and you're in!

Write for further details—for engineering help with your crusher problem!

EAGLE

JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS

CRUSHER CO., *Inc.* **GALION**
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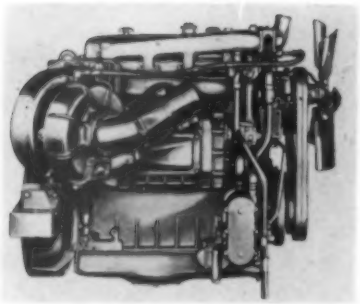
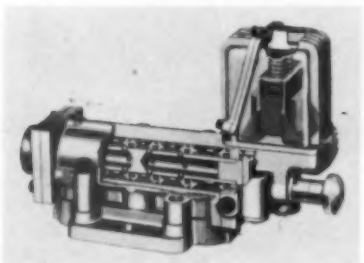
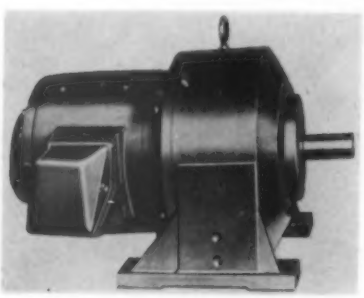


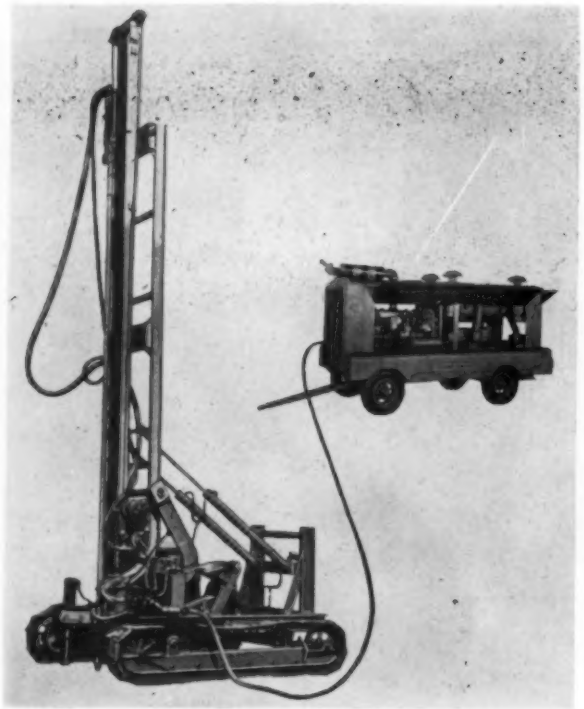
● Three Turbopower engines have been added to the Series 71 line of industrial two-cycle diesels made by the Detroit Diesel Engine Division of General Motors. Four- and six-cylinder fan-to-flywheel engines and a six-cylinder base-mounted power take-off unit are now available. With the addition of a single-shaft, exhaust-driven turbine and air impeller, a more powerful diesel of greater fuel economy has been produced. ↑ (56)



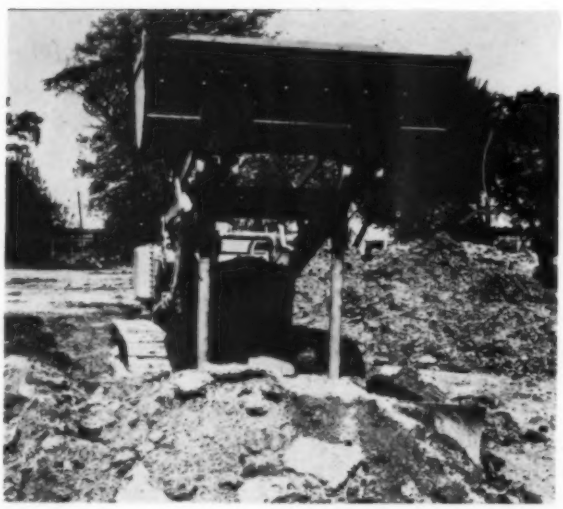
● C. B. Hunt & Son, Inc., has introduced a new line of "B"-Type control valves, said to offer many features never before available. A shock resistant mounting for the solenoid reduces hammering and vibration and greatly prolongs solenoid life. Valve chambers are formed by aluminum spacers held in accurate metal to metal end abutment, greatly simplifying internal construction and servicing. An override button permits manual operation of the valve during installation or in case of power failure. ↑ (57)



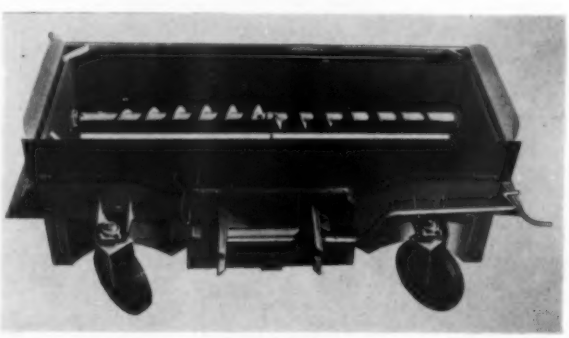
● A new line of gearmotors is now available in both a.c. and d.c. from 1 through 60 hp. from the Reliance Electric & Engineering Company. The gearmotors are designed and built to give long, trouble-free performance even under adverse operating conditions. Two-way seals lock oil in and seal dirt out so that the gearmotors may be mounted in almost any position without oil leakage. Induction hardening provides extremely hard tooth surfaces on tough alloy steel gears. ↑ (58)



● Gardner-Denver's Rotary 900 is a two-stage compressor that delivers 900 cu. ft. of air power per minute. A water cooling system permits steady, full-capacity operation in any climate. The design is simple, and all parts of the machine can easily be inspected and maintained in the field. The Model DH143 rock drill is furnished with an air-powered, self-propelled crawler mounting which is highly maneuverable. The chain feed drilling mast accommodates 20-ft. rod changes, and can be adjusted hydraulically to drill toe holes at 15 deg. below the horizontal. ← (59)



● Three new angling blade bulldozers, designed for use with Caterpillar No. 977, No. 955, and No. 933 Traxcavators, have been announced by Caterpillar Tractor Company. The new bulldozers can be mounted or dismounted in a few minutes, making the machine easily available for either excavating or production bulldozing. Strong links are used to connect the bulldozer C-frame to the Traxcavator lift arms. Hydraulic controls and cylinders are used for both bucket and blade. ← (60)



● The new Model "L" aggregate spreader, manufactured by the Highway Equipment Company, Inc., incorporates many new engineering features. The swivel wheel arrangement on the front of the spreader prevents the unit from tipping forward or backward when unhooked from the truck. A larger diameter feed roller with deep cut right and left spirals to grip material makes it possible to spread from fine sand to 2-in. dia. crushed rock. A new type spreader hitch allows fast hookup to all types of trucks. Reversible transmission automatically shifts into forward gear when going ahead and into reverse when backing up. ↑ (61)

It's time to compare . . . with LINK-BELT SPEEDER

Now Link-Belt Speeder gives you "small rig" speed in a

new 3-yd shovel-crane

Here's the K-608 with true power hydraulic controls. It's faster . . . more agile and mobile . . . easier to handle than many machines half its size!

THE only machine in its class offering true power hydraulic controls—the K-608 responds quickly, precisely, positively to a touch of its operator's fingertip. It all but eliminates operator fatigue, boosts output by up to 25% or more!

Furthermore, the way a K-608's power follows the load is all but unbelievable. That's because a torque converter and tailshaft output governor (standard) automatically and perfectly match engine output power to the load. You get heaping dippers in a hurry, save needless wear on the power train, cut fuel costs.

And, the K-608 is precision-made of quality components with plenty of stamina to stand up under continuous use of great usable horsepower. It's designed to cut downtime, too. Clutches are hydraulic actuated, automatically compensate for heat and normal lining wear.

Every day you don't have a K-608 on the job is costing you substantial extra output. One look will convince you. So why not call your distributor right now. Ask him where you can see a K-608 at work. Link-Belt Speeder Corporation, Cedar Rapids, Iowa. 14.081

LINK-BELT SPEEDER

Builders of a complete line of crawler and rubber-tired shovel-cranes

CHECK THIS BRIEF LIST OF THE OUTSTANDING K-608 ADVANTAGES

- 75 TONS RATED LIFTING CAPACITY
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- ALL-WELDED, STRESS-RELIEVED UPPER AND LOWER FRAMES increase machine life.
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- FREE-SPOOLING DRUMS mounted in anti-friction bearings allow greater free rolling action with minimized power loss . . . positive alignment makes smoother braking, clutching.

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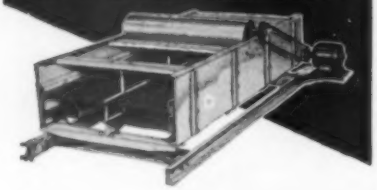

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There's a model to fit your particular requirement, priced within the smallest budget.

Write today for free catalog #1501

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Quality Screens Since 1919

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Shovel Dippers
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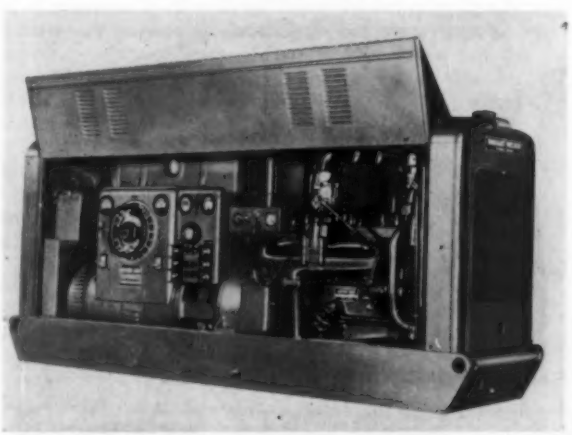
Pulverizer Hammers
Grate Bars—Breaker Plates

Ball Mill Liners
Screen Plates

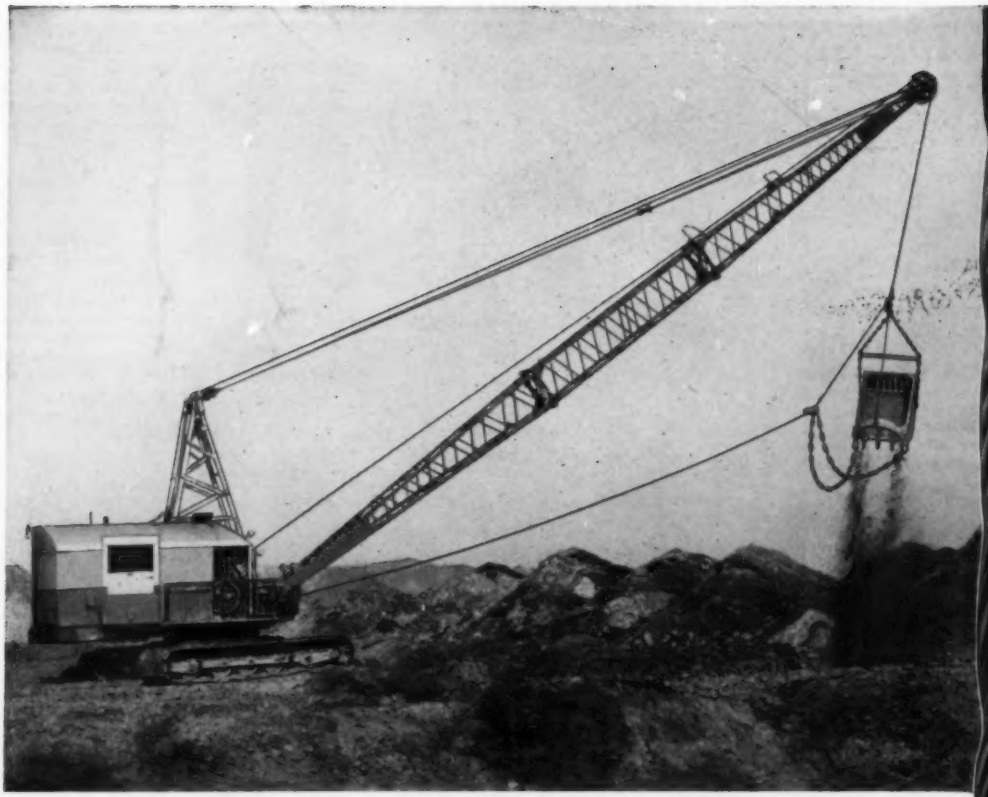
The Frog, Switch & Mfg. Co. CARLISLE, PA.
ESTABLISHED 1881

● A new "V-Line" of heavy-duty trucks, featuring three new V-8 engines, is now in production at International Harvester Company. Nine series of trucks in conventional and cab - over - engine, four- and six-wheel design, comprise the V-Line. Six-wheel truck model VF-192 with dump body is illustrated. Models are available with gross vehicle weight ratings of 24,000 lb. and up, and gross combination weights of 50,000 lb. and up. Power is supplied by V-8 engines of 401-, 461-, and 549-cu. in. displacement with horsepower ratings of 206, 226, and 257, respectively. The Comfo-Vision cab features dual cowl vents for added comfort. ← (62)

● A new, faster method of splicing conveyor belts with Flexco Belt Fasteners has been announced by the Flexible Steel Lacing Company. New templets eliminate the inconvenience of inserting fasteners from the pulley side. A new boring bit and alloy steel wrench have been designed for use in standard electric or air impact tools. Their use cuts considerably the time formerly taken to apply fasteners by the hand method. The illustration shows the templet being used to position the bolts for one end, after the fasteners have been inserted through holes in the other end of the belt. ↑ (63)



● Hobart Brothers Company has developed a gasoline engine driven d.c. arc welder with 6 kw. or 12 kw. a.c. auxiliary power. The welder is available in 300 and 400 amp. size. Full capacity can be used to provide 110- or 220-v. power service, or the capacity can be divided between the two. The welding control panel is equipped with current range hand wheel, volt-amp. adjuster, and welding cable connecting studs; welder ammeter and voltmeter are optional equipment. ↑ (64)



LAY-SET VHS

15% Stronger • Tougher • More Wear-Resistant

New VHS Dragline Lasts 58% Longer ...at Keller Mines

• Mr. John Oreskovich, Superintendent of Keller Mines, Inc., Beloit, Ohio says: "9 to 12 days used to be about all the life we could expect from the best Improved Plow Steel draglines on this Lima 1201 excavator. However with new VHS we are getting from 19 to 24 days—increasing service life from 58% to over 100%. Naturally we have switched to VHS on every piece of equipment for which a VHS line is made."

Service records like this are becoming commonplace in the mining industry. For new tougher VHS resists abrasion . . . keeps its shape under pressure . . . can't become "hide bound" or lose its flexibility. Developed specifically for draglines, slusher ropes and shovel hoist ropes, it stands up better in these toughest of wire rope applications.

Cuts "Down Time," Saves Money—The longer life you get from new VHS saves you money. And you make additional savings by cutting costly "down time" of equipment for wire rope replacement.

Stronger Too—New VHS, made from a new grade of steel for wire rope, is at least 15% stronger than Improved Plow Steel—the strongest grade available before the introduction of VHS. This means you can handle heavier loads with the same diameter line. And you have a higher factor of safety . . . additional insurance against sudden overstresses.

Easy to Order—You don't need any complicated specifications to order new VHS. Just call your Hazard distributor and ask him for a VHS dragline, shovel hoist rope or slusher rope in the size you want. He has it in stock.

For more information see your Hazard distributor salesman or write to the nearest Hazard office for Bulletin DH-513H

HAZARD WIRE ROPE DIVISION
American Chain & Cable Company, Inc.
Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

YOUR OPPORTUNITY!

UNUSED Army Trucks
2½, 3½, 5-ton

GMC-DIAMOND T & INTERNATIONAL 6x6's

- *From Government Storage!*
- *Unused and Guaranteed!*
- *Factory-New Condition!*
- *Delivered on Approval!*
- *Reconditioned Trucks Also Available!*

Tandem axle trucks with front wheel drive, 10 forward speeds, overdrive, brand-new mud and snow tires. Carry maximum loads, give extra power you need in "rough going" . . . at LESS, often half the COST of conventional new trucks.

For Specifications, Prices, Delivery:
Phone Collect
MILTON Y. TOOMBS, Jr.
Sales Manager

MEMPHIS EQUIPMENT Company
CONSTRUCTION AND AUTOMOTIVE EQUIPMENT AND PARTS
766 SO. THIRD ST. MEMPHIS, TENNESSEE

98 USERS IN 100 *say* GILSON IS FOR YOU!

The GILSON Screen

is designed for quick, accurate size-testing of crushed stone, gravel, slag, coal, ores, and similar materials. It handles up to one cubic foot of sample, makes seven separations simultaneously in five minutes or less.

A questionnaire to GILSON users, many of them owners of several screen units, showed that 97.5% not only approved GILSON, but recommended it to others. The remaining 2½% includes 1% who found GILSON performance satisfactory but reserved recommendation, and 1% with no comment.

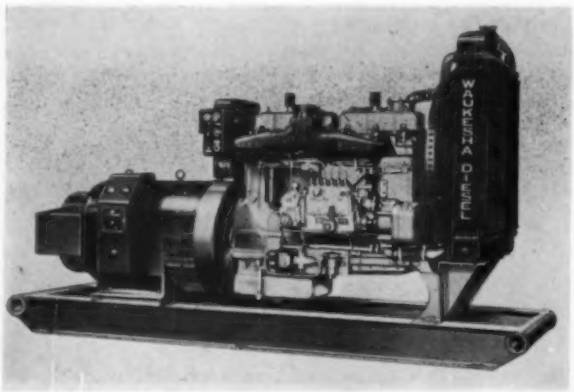
GILSON users cut costs, increase profits by avoiding guesswork and error in meeting sizing specifications.

87.1% of GILSON owners reported maintenance "normal" or "light." Of these units in use at least 3 years and up to 14 years, 32.3% report *no maintenance except lubrication!*

Write for information and prices NOW!

A Sand Attachment for handling 8-inch sieves is optional equipment.

GILSON SCREEN CO.
MALINTA, OHIO

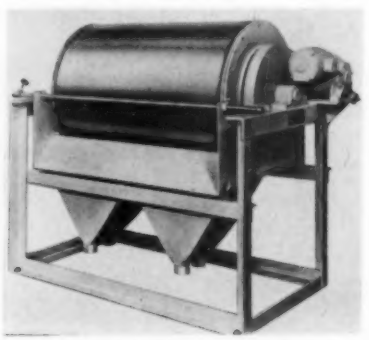


● The Waukesha 148-diesel series Industrial Enginator set, one of a new line of engine-generator sets developed by the Waukesha Motor Company, is available in capacities from 50 to 120 continuous kw. rating. The 148-diesel is available as a normal diesel with either standard crankshaft or counterbalanced crankshaft, or a turbosupercharged diesel with counterbalanced crankshaft. ← (65)

● A hand-operated, high-pressure oil gun for contacting standard lubrication fittings has been developed by Lincoln Engineering Company. With this oil gun, it is now possible to have positive pressure lubrication with oils, as well as flushing and cleaning of bearings which require periodic applications of fluid lubricant. Metal rings annodized in various colors are used with the pressure oil gun. They are slipped over the head of each fitting to provide a color coding system for all bearings requiring oil, thus simplifying standardization. In addition, these rings make the accidental use of a grease gun impossible. ↑ (66)

● Beta Corporation's new oil-tight, dust-tight vibration monitor anticipates trouble and shuts down rotating equipment before costly damage occurs. Failing bearings, unbalance, broken blades, and bent shafts are instantly detected from slight increases in roughness or vibration. The vibration responsive switch is adjustable over a wide range of normal vibration. It is enclosed in a gasketed box with an external reset operator which may be locking or non-locking. Applications include blowers, air compressors, and other equipment located in oil or dust-laden areas or subjected to spray. ↑ (68)

● The RC-5, a new, small, bin vibrator for lightweight applications, is available from The Cleveland Vibrator Company. Weighing only 25 lb., the RC-5 is designed for use on hoppers, bins, chutes, packers, and all other bulk handling equipment. An important feature of the RC-5 is its silent operation. It is electrically operated and is available in all common voltages, a.c. only. ↑ (67)



● Developed by Stearns Magnetic, Inc., the "WPD" wet drum permanent magnet unit was designed for efficient recovery of media in heavy density plants. The specially designed magnet provides correct flux distribution for positive transport of the collected magnetics to the discharge point. Alnico permanent magnets are used, which require no external energization. ↑ (69)

Collinson Stone Company
Moline, Illinois

Shovel has gone 20,000 hours without major overhaul using Cities Service C-300 Motor Oil

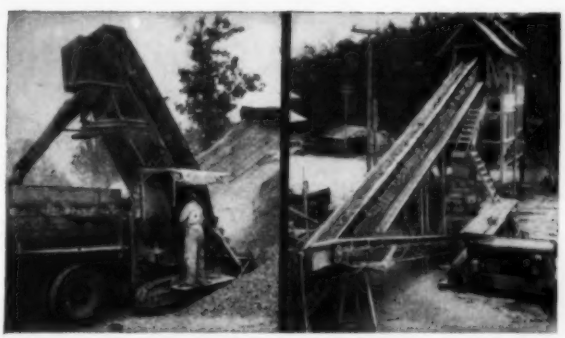
Helping Collinson Stone Company to produce better than ¼ million tons of limestone products per year, the Northwest shovel, pictured above, rarely gets a rest.

For the past seven years, it has been on the job almost daily, logging better than 20,000 work-packed hours. Yet, in all that time, it has never required a major overhaul—and still doesn't—thanks to Cities Service C-300 Motor Oil.

Says President Earl Collinson: "That's typical of the kind of results I'm getting using Cities Service fuels and lubricants in *all* my equipment—tractors, bulldozers, cranes, crushers, and compressors.

"Multi-Purpose Trojan H-2 Grease, for example, solved a bearing problem that we had on our vibrating screens. In cold weather they'd bind so badly that we had to heat them to get them going—but as soon as we switched to Trojan H-2, with its high temperature performance and low temperature pumpability, the trouble disappeared. Experiences such as this have convinced me that nothing compares to Cities Service lubricants for a rugged quarry operation such as ours."

This is one of a continuing series of reports from quarry operators for whom Cities Service products have proved ideal and unmatched. Your local Cities Service Lubrication Engineer can explain the many reasons why. Why not have a talk with him. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

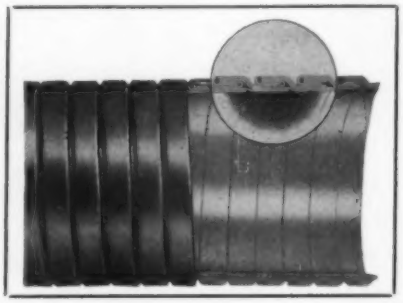


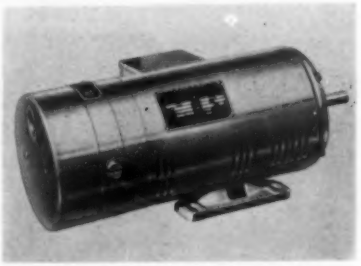
MORE OF COLLINSON'S EQUIPMENT. In addition to its 1½ yard Northwest shovel, the firm has two Bucyrus-Erie cranes, two tractor-dozer units, a Gardner-Denver air compressor, and two Austin Western crushers—one jaw crusher and one roll crusher. Six stationary diesels power the compressor and crushing units, and these diesels have averaged 12,000 hours before major overhaul with Cities Service C-300 Motor Oil.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

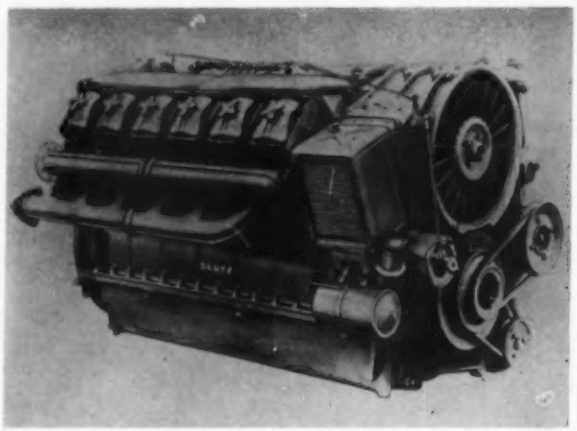
● CMH "Abrasion-Resistant" Flexible Tubing has been designed by the Chicago Metal Hose Division, Flexonics Corporation, specifically for conveying, loading and unloading, and for the removal of slag and cinders. Illustrated is a cross-section showing how the strip inner liner is incorporated into the construction to become an integral part of the tube. The liner covers the convolutions and the spacing between convolutions, thus protecting the convolutions from abrasion and producing a smoother inner bore. The construction lengthens tube life, cutting maintenance and replacement cost. → (70)

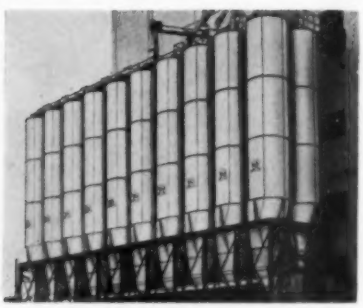




● The Dynamatic Division, Eaton Manufacturing Company, can now supply its adjustable speed, fractional horsepower, Ajusto-Spede Drives with integral electrically operated fail-safe brakes. The small single package drive is an integral combination of a.c. constant speed induction motor, eddy-current coupling, friction brake, and electronic control. A simple connection to a standard power line is the only wiring required. ↑ (73)

● Deutz air-cooled diesel engines are available in outputs of up to 250 hp. The Deutz engine can be run on straight diesel oil, on low octane gasoline plus motor oil, or on jet fighter fuel. The simplicity of the cooling system reduces maintenance to a minimum. Advantages include low fuel consumption, a torque curve at its peak in the lower ranges of speed, nontoxic gas, lower exhaust temperatures. → (71)



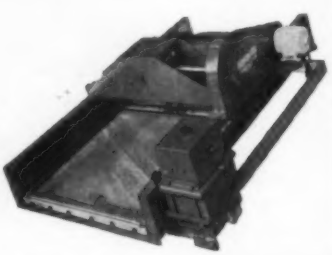


● Built and shipped in easily erected sections, Day bins are constructed by bolting together, and the capacity can be easily increased by adding extra sections. Day bulk storage bins are available in sizes from 3- to 14-ft. in dia. to 100-ft. high. Fireproof and vermin-proof, the bin walls cannot flake or contaminate material. Flush-joined, smooth interiors are free of obstructions. ↑ (74)

● The Yumbo, manufactured by Geco, Inc., is an all-purpose tool with the following attachments: ¼-cu. yd. backhoe; ⅝-cu. yd. front dump bucket; ⅜-cu. yd. rock bucket; ⅝-cu. yd. gravel bucket; ½-cu. yd. clamshell; 6,500-lb. crane hook. Change of attachments can be made in ten minutes by one man without any hard labor. → (72)

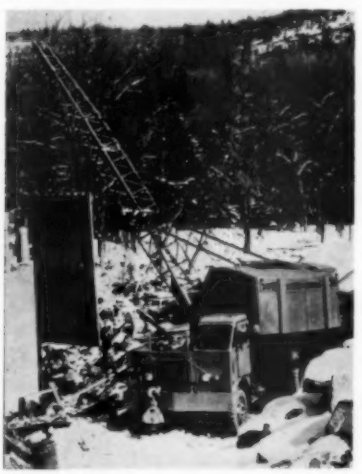
For Difficult Fine Mesh Damp Screening

For the screening of damp or sticky materials such as silica sand, lime or ag-lime, the Leahy® Vibrating Screen with FlexElex heating of the jacket is unexcelled. Differential vibration snaps wedging particles loose and FlexElex keeps the mesh dry and wide open for accurately sized, full capacity production. Ask for Bulletin 16-EH. It may save thousands of dollars for you.

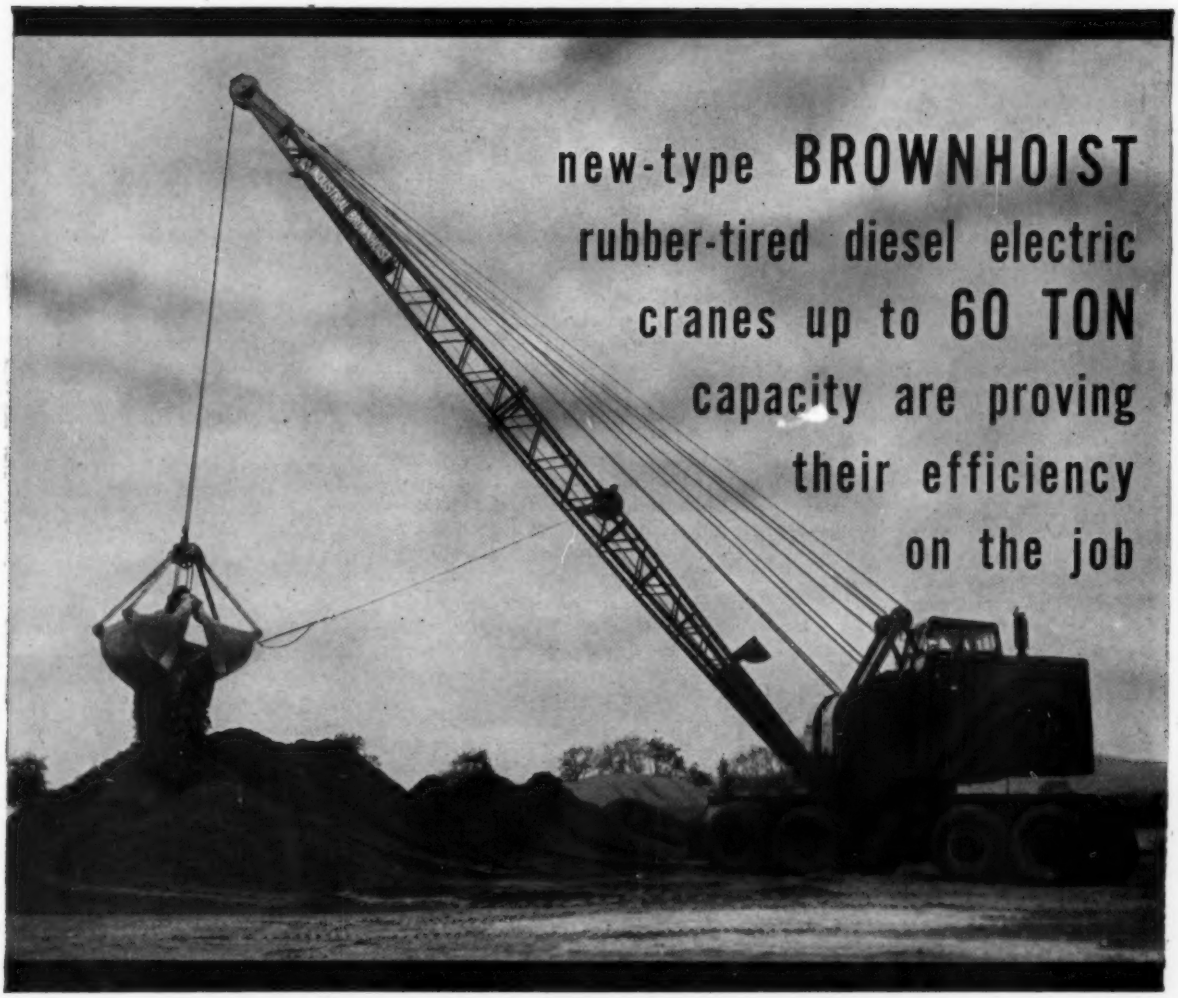


Made by the Original Deister Company Incorporated 1906

THE DEISTER CONCENTRATOR COMPANY
911 Glasgow Avenue, Fort Wayne, Indiana



● A truck crane version of the recently improved Model 305 excavator is in production at the Koehring Company. As a crane, it lifts loads up to 25 tons, and its road travel speed is 30.2 m.p.h. It is easily adapted to any type of crane operation, including lift, clamshell, and dragline. For special high lift crane service, the standard 30-ft. main boom can be extended to a maximum allowable 100-ft. length. ↑ (75)



183

BROWNHOIST MATERIAL HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, Denver, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

The new Brownhoist Wagon-Cranes are specifically designed to do an outstanding job wherever high mobility and high capacity are required. You'll see them at work performing heavy duty jobs in mines, quarries, steel mills, for railroad and lumber operations and for many other large industries. Equipped with dynamatic clutch, anti-friction bearings at all essential points, power steering, electric travel and electric rotation. Mounted on a 12 wheel crane carrier capable of speeds up to 8 miles per hour, the unit can be operated by one man from easy-to-reach controls. Economical to operate. Available in capacities from 25 to 60 tons. For specification folder or further details, get in touch with our nearest representative or write us at Bay City.

SUBSIDIARY OF Penn-Texas

BROWNHOIST

Labor Developments

The Specter of Unemployment

Another P&Q Exclusive

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D. C.-Philadelphia, Pa.

THE rapid rise in unemployment resulting from layoffs by the automobile industry has cast a pall over the city of Detroit and most of the state of Michigan. To be sure, output and employment cutbacks in the automobile industry should not have been unexpected. It was unreasonable to expect a repeat performance of the tremendous sales of 1955.

Nevertheless, in Detroit today, one out of every ten employees is out of work. Many of them have been out of work since March and April. Furthermore, employment is unlikely to pick up in any substantial quantity until after the model changeovers have been completed in the late summer and early fall.

Unfortunately, when layoffs are so heavily concentrated, the effect is a tendency to multiply. Associated with a heavy cutback in automobile production there is always a parallel cutback in the production of parts suppliers. Furthermore, there seems to be a tendency for all the automobile manufacturers to go up and down at the same time. The further effect on the sale of consumer goods, particularly durable consumer goods, is inevitable.

The blow is softened to some extent, of course, by unemployment insurance. But even in Michigan, which has one of the most liberal benefits structures of all the states, the maximum benefits to workers with the highest incomes and the largest families is only $54 a week, while the *average* benefit is less than $34 a week. This average is only about one-third of the average previous weekly earnings of the laid off employees.

Guaranteed Wage Disappointing

"But, what about the much-vaunted guaranteed wage which the Auto Workers won with so much fanfare and flurry? Won't that take care of a large part of the problem?" persons frequently ask.

While the production race last year, particularly between Ford and Chevrolet, made it especially easy for that union to win a guaranteed wage (or more accurately, supplementary unemployment pay plans), the rapid let-down this year has been most unfortunate in that it has forced a test of those plans before they were quite ready for testing.

First of all, the plans provide rather modest benefits. Generally they are designed to pay the difference between unemployment compensation benefits and about 60 percent of previous after-tax take-home pay. This would give most of the unemployed auto workers only an additional $10 to $15 a week.

Actually, if a large amount is paid out on these supplementary unemployment benefits, even those amounts will be cut by 20 percent if the amount in the trust funds dwindle below 13 percent of their maximums. Since contributions to the trust funds have been made for only one year, and unemployment hit long before the year was completed, they are unlikely to have more than 20 percent of the maximum amount in the funds.

The fact that there has not been sufficient time to accumulate adequate funds has an even more serious consequence. To protect the funds from rapid exhaustion, the number of weeks of benefits is reduced below the agreed upon maximum of 26 weeks, depending upon the adequacy of those funds. In the formula worked out for this purpose the duration is cut back far more drastically for employees with fewer years of service than for long-service employees.

Thus, assuming that the funds have managed to accumulate only 20 percent of their maximums, employees with: 1 to 5 years' seniority would receive benefits for only 3 weeks; 5 to 10 years' seniority would receive benefits for only 4 weeks; 10 to 15 years' seniority would receive benefits for only 5 weeks; 15 to 20 years' seniority would receive benefits for only 6½ weeks; 20 to 25 years' seniority would receive benefits for only 8 weeks; 25 or more years' seniority would receive benefits for only 9 weeks.

The realization that the supplementary unemployment benefits are so severely limited is just beginning to dawn on large numbers of unemployed workers in Detroit and other automobile centers, and they are bitterly disappointed.

If the program had had the opportunity to operate without an unemployment crisis for another year, the duration of benefits might have been far better. If it could have operated for about five years without serious setback, practically every unemployed worker would have been eligible for the full 26 weeks of benefits.

It is unlikely that this disappointment will force the union to junk its program for winning similar supplementary unemployment benefits from many other employers. Quite the opposite. It is most likely that future bargaining on this subject will take the Detroit experience into consideration and will require special protections, which may be quite expensive, to prevent a repetition of what has become the severest test to date of wage guarantees.

General Refractories Company To Build Smithville, Ont., Plant

Officials of the General Refractories Company, Philadelphia, Pa., recently announced plans for the building of a plant at Smithville, Ont., by its subsidiary, General Refractories Company of Canada Ltd.

Located on the Niagara peninsula, 20 miles from the steel center of Hamilton, the new plant will be in the heart of Canada's fastest-growing industrial area.

The Smithville plant will manufacture Grefco's chemically-bonded basic brick, including steel-encased Steelklad and Ritex brick, as well as mortars, castables, and other refractory specialties. Allowances have been made in plant plans for extensive expansion as Canada's demand for refractories increases.

Belt conveyor scale and instrument
Read-out to auto-typewriter or tape puncher
Sequence batcher for manual programming
Punch card operated sequence batcher
Desk instrument for weighing
Desk instrument for weighing and printing

Now...we're way beyond weighing–electronically!

The Fairbanks-Morse line of electronic instrumentation performs many functions beyond the elementary process of weighing. It will, for instance, register and record weights at a remote location. It will perform automatic sequence batching—say, from a punch card. It will translate weight messages into the language understood by automatic typewriters, automatic adding machines, tape punchers, other data processing machines. It will control a complete plant materials flow program.

This instrumentation is now available with Fairbanks-Morse truck and track scales, axle-load scales, warehouse and portable scales, and many other types of weighing machines.

The weight message is created in the electronic load cell. Fairbanks-Morse employs it in two ways. The *Full Electronic* system utilizes multiple load cells. In the *Levetronic* system, a single load cell is incorporated in a conventional lever system. (Your present lever scale can probably be converted to *Levetronic*.)

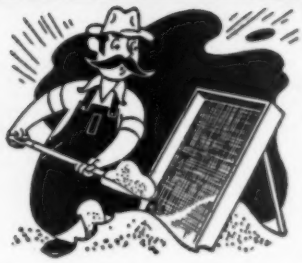
New Fairbanks-Morse literature is available on all these electronic scales, batchers and instruments. Write today. Fairbanks, Morse & Co., Scale Division, Dept. PQ-7, 600 S. Michigan Ave., Chicago 5, Ill.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

Screenings



by Ray L. Smith Jr.

FRIEND . . . When things don't come out right . . . he comes right in. When none of your dreams come true . . . he is. He never looks for your money . . . except when you've lost it. He never gets in your way . . . except to clear it for you.

Nothing is more important to him than making you important. He is in your corner when you're covered. He turns up when you get turndowns. All he wants in return for his helping hand is your handshake.

He never insists on seeing you . . . except when nobody else wants to. He raps your critics when they're wrong; and takes the rap for you . . . when you're right. The only way he sponges off you is to absorb some of your troubles so you can have strength left to fight the heels.

When you're taking bows . . . he bows out. You can do anything you want with his friendship . . . except buy it or sell it. He makes you realize that having a real friend is like having an extra life. All he asks of your friendship is the privilege of deserving it.

Defeated

THE RANKS of the defeated seem to be where the boys down Iowa way are headed. Beavers are waging a continuing battle against a construction company paving a highway north of Greenfield. The engineers "of the animal world" are conducting rear-guard action against the human construction crew and the situation develops into quite a contest.

The beavers have a dam and pond on Middle River near the limestone quarry which is furnishing rock for the paving project. Water is needed to wet down the rock being used as a road base. With water being scarce in this area, the beaver pond, which is fairly large and deep, has proved to be an ideal source close to the construction work.

An electric pump was installed on the bank by the human crew. It pumps water to the loading platforms at the quarry, where it washes the crushed rock.

The beavers were quick to trace the loss of water from their pond.

The pump is shut down at the end of the day and each night the beavers plug the intake. Each morning workmen at the quarry must wade into the pond and *unplug* the intake before they can start operations for the day.

This little game has been going on for over a month now—ever since the pump was installed. Betcha, those beavers are mighty glad to see Sundays roll around so they can rest up.

Potpourri and Succotash

Cutie No. 1—One week after my sailor boy friend started going to a physical culture expert he picked up 110 pounds.

Cutie No. 2—How did he do it?

Cutie No. 1—By whistling at me!

"Is it true you gave up smoking and drinking for her?"

"Yes."

"Is it true you quit being lazy and got a job so that you could support her?"

"Yes."

"And is it true that you gave up your old cronies and began associating with proper people to win her affection?"

"Yes."

"Well why didn't you marry her then?"

"I found that with all this improvement, I could do better."

"Dad," asked the small boy, "why isn't a man allowed to have more than one wife?"

"My son," replied the father, "when you are older you will realize that the law protects those incapable of protecting themselves."

Teacher: "Johnny, please tell the class where the English channel is."

Johnny: "I'm sorry, teacher. We don't get that channel on our TV set."

Tramp (to fat lady): "Lady, please have mercy on me. I haven't eaten in four days."

Lady of the House: "My word, I certainly wish I had your will power."

A student reporter on a high school paper, covering a class play, hit the literary jackpot when he wrote:

"The high school auditorium was filled with expectant mothers eagerly awaiting the appearance of their offspring."

Kid Story: A teacher had been giving her class a description of different kinds of railroad cars and she paused to ask if any one knew what cars that carried cattle were called. A moment of silence, and one of the youngsters came up with, "I know, they are Cattelacs!"

A navy recruit on guard had strict orders to admit no car unless it bore a special tag. He stopped a car carrying a high ranking officer and heard the brass instruct his chauffeur:

"Drive right through."

"I'm sorry sir," said the recruit, deferentially, "but I'm new at this. Who do I shoot—you or the driver?"

"Could I try on that red dress in the window?" asked the pretty young thing.

"There's no need to do that," the elderly saleslady answered coldly. "We have several fitting rooms."

Mary had been promoted to the third grade.

Meeting her second grade teacher, whom she liked very much, she said, "Gee, Miss Kate, I wish you were smart enough to teach me this year too!"

Fisherman: "I tell you it was that long. I never saw such a fish."

Friend: "That I believe."

BUCYRUS-ERIE CHURN DRILLS

FOR LONG-RUN DRILLING ECONOMY

Cost records of many experienced quarry operators show that in some types of formations Bucyrus-Erie churn drills put down blast holes far more economically than any other type of drilling equipment.

Swinging heavy tool strings up to 6000 pounds, these drills have the punch needed to lick stubborn formations. Whatever type of power you select—gasoline, diesel or electric—you get a big heavy-duty power unit that easily handles the tool load. Efficient power application keeps fuel or current consumption low.

Bucyrus-Eries are built to take the shock of rock drilling in stride, too. Tough rubber discs in the derrick head put snap into the drilling motion and absorb shocks before they reach machinery. Rubber insulated spudding beam and heel sheaves further dampen the vibrations of drilling. The drilling machinery is supported by an all-steel, all-welded box-type frame that insures perfect alignment, low maintenance, long life.

Team up all these advantages with full mobility and easy control and you've got a rig that can't be beat for productivity and dependability. Four models to choose from: 50-T, for 9- to 12-in. holes; 29-T for 6-⅝- to 9-in. holes; 27-T, for 6- to 6-⅝-in. holes; and 22-T, for 5-⅝- to 6-⅝-in. holes. Write today for complete information on the model of your choice.

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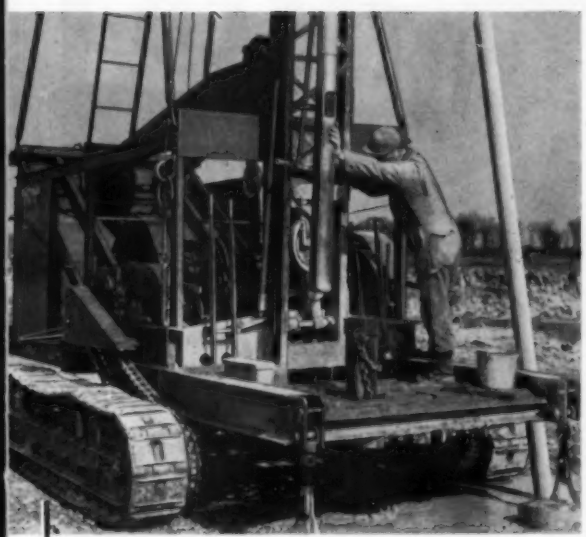

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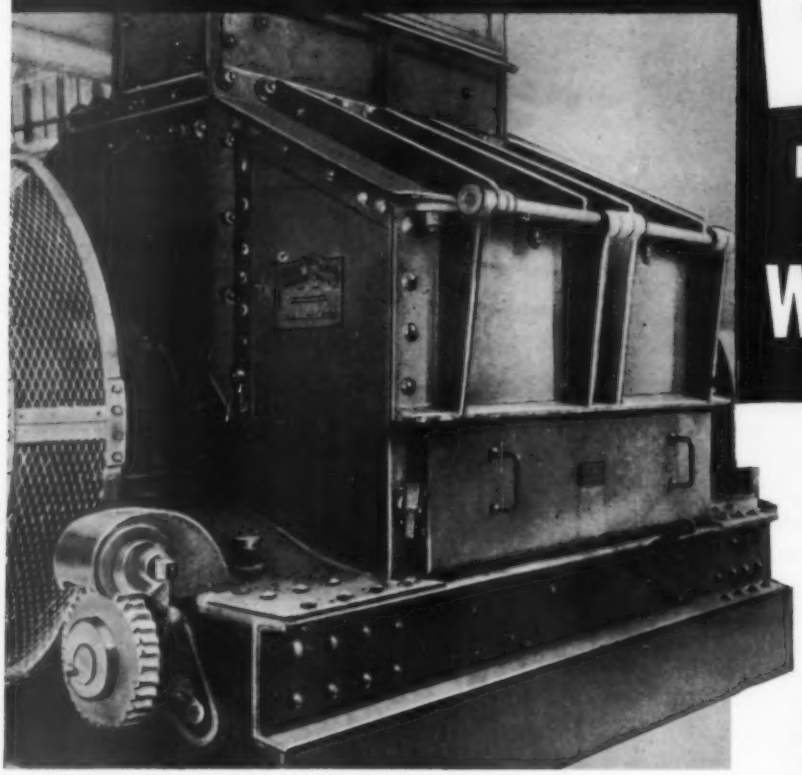

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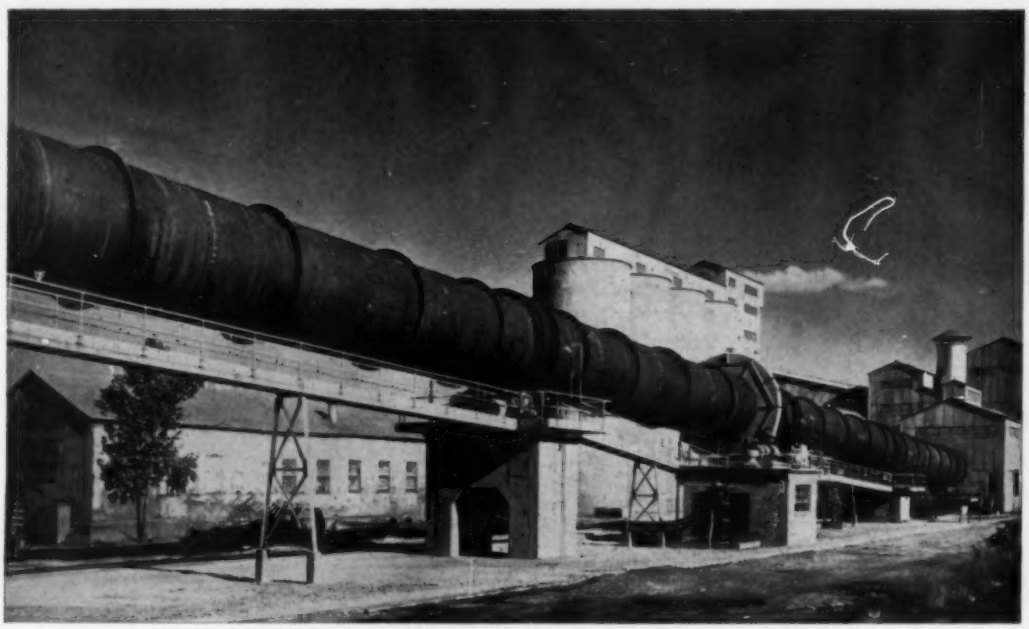

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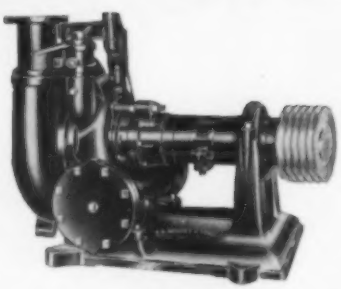

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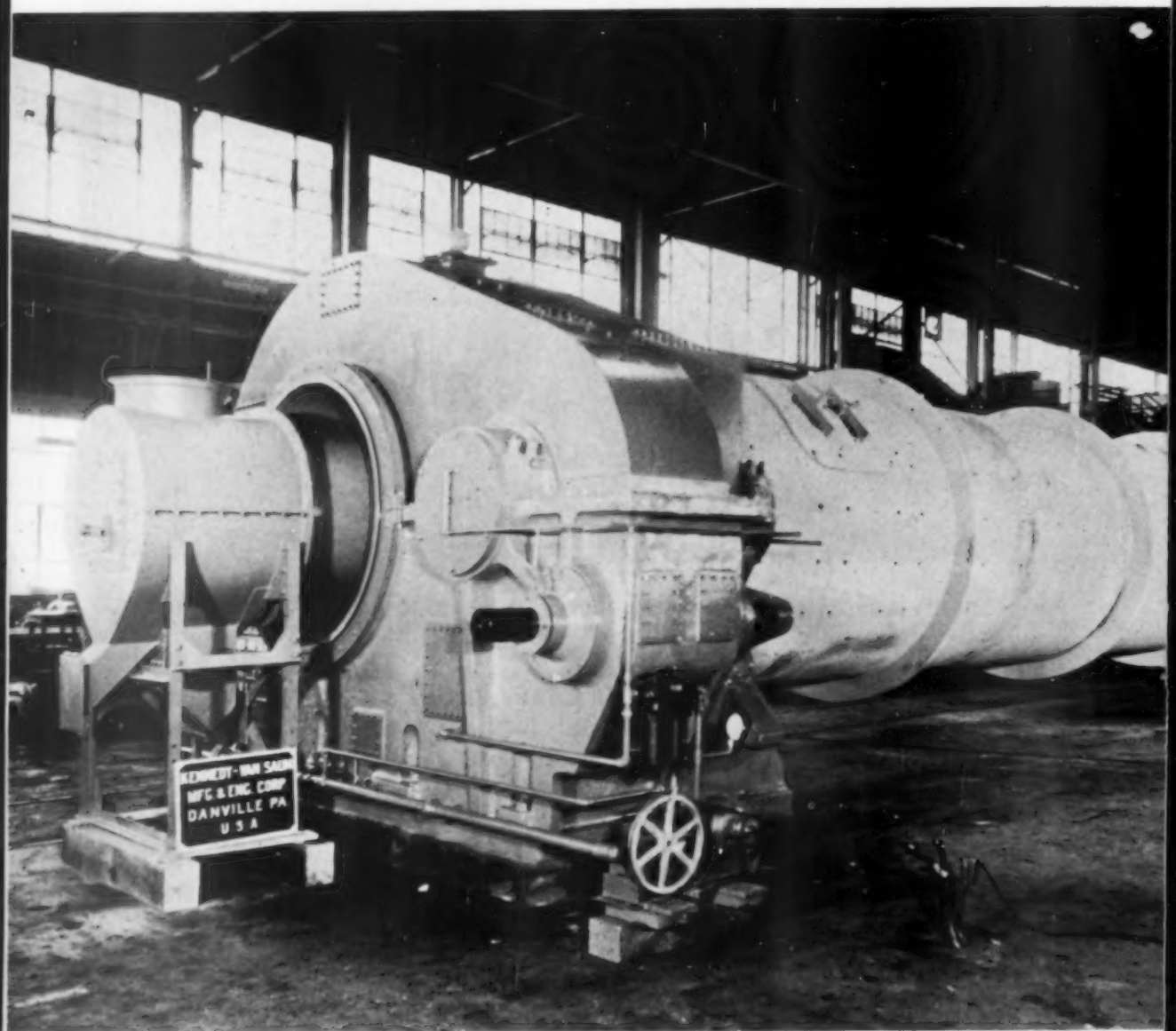

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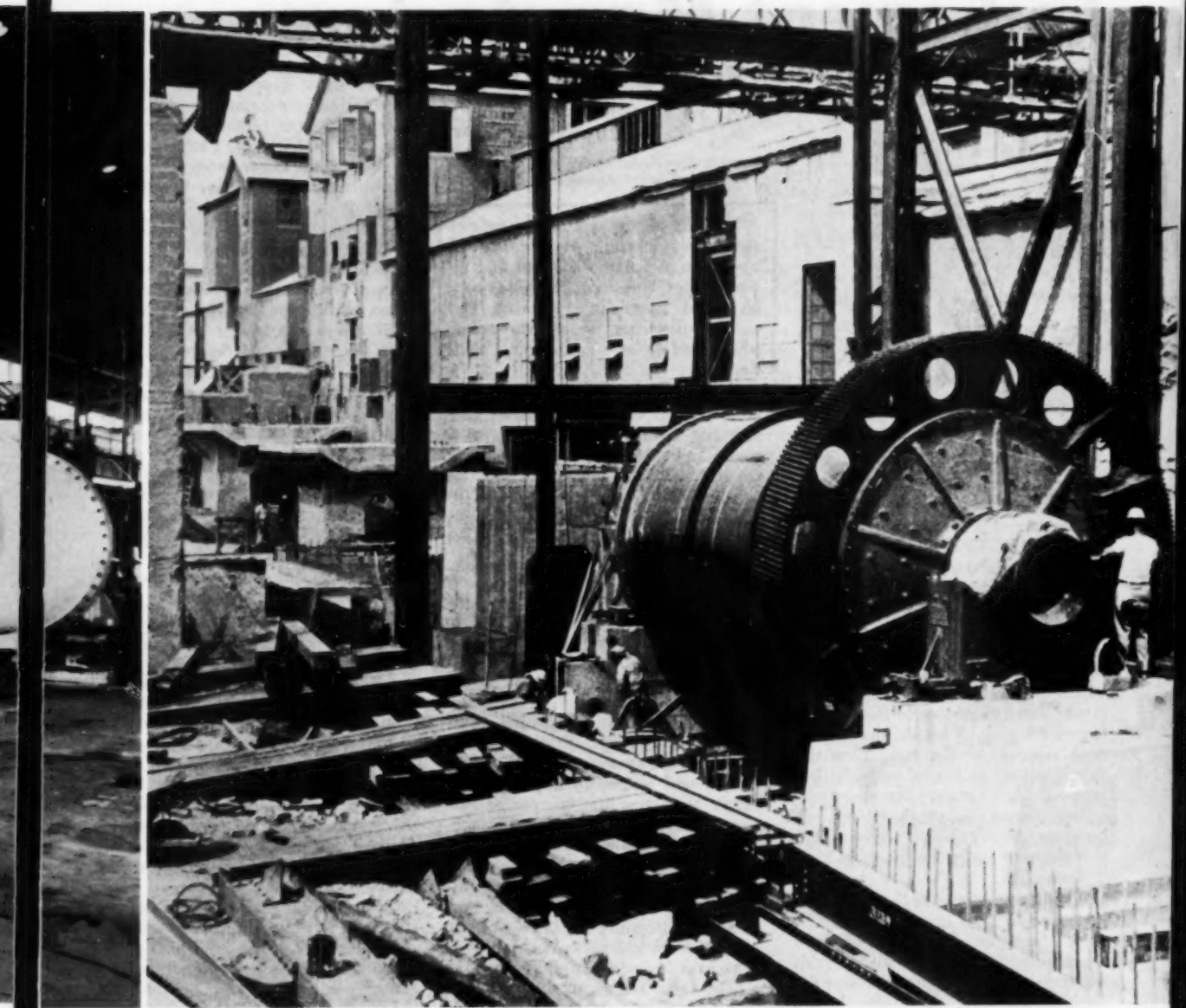

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Rational Approaches To Cement Manufacture

By WILHELM ANSELM*
Translated by
C. F. CLAUSEN

Director, Manufacturing Process Department
Portland Cement Association, Chicago

The following account contains some thoughts on intensification of operation of rotary kilns and mills in the cement industry. Speaking from his great practical experience, the author develops some viewpoints which lead to new and original solutions.

EFFICIENCY OF KILN OPERATION

Intensification of Combustion Intensification of combustion in rotary kilns in the cement industry has not received the proper consideration and treatment. The flow process in kilns, among other things, is of outstanding importance, and it is necessary to apply knowledge of fluid mechanics to the study.

The entire problem of increased production of a rotary kiln is actually one of intensified combustion, so that the decisive importance of the sintering zone, and what happens in it, should be studied.

A fundamental viewpoint, which has not until now been accepted in the cement industry, is that air must be considered a fuel, and that, consequently, it will be possible to burn with low-value coal if the injection is controlled correctly.

It becomes possible to intensify the combustion, leading to improved production and heat economy, when considering that coal grinding—which has always been considered of great importance — consumes between 10 and 15 kw.-h. per ton of coal, whereas at the same time the injection of this coal—which has received but scant attention—requires almost as much power. It becomes particularly important, therefore, to study the injection conditions.

The power consumption used for coal-air injection can be calculated, as a minimum, by means of fluid mechanics, and the velocity of this mixture can be so controlled that the desired shape of the flame is obtained. This velocity of the coal-air mixture must be adjusted to kiln production. For small kilns with a capacity of 2,000 bbl. per day the injection velocity is about 8,000 f.p.m.; for larger kilns—5,000 to 7,000 bbl. per day—20,000 to 24,000 f.p.m.

The position of the flame is then about 10 in. behind the nozzle. This distance between the nozzle and the actual flame is of utmost importance; if the flame is intensified and the burner pipe pulled back as far as possible, it becomes necessary to protect the discharge end of the kiln and the nozzle against overheating. Otherwise disturbances will occur which will make it impossible to reach the requisite 95 percent of capacity. A Root's positive displacement blower is better suited for providing a high air velocity than a centrifugal blower. By using increased pressure it has become possible, for example, to burn anthracite containing 7 percent volatiles in cement kilns without difficulty.

The usual design of the coal pipe nozzle is shown in Figure 1a. Entering the burner pipe through a flanged piece, the coal drops into a stream of air with a velocity of 4,000 to 8.000 f.p.m. and is mixed with it. The design has the drawback of an extremely high pressure drop.

This disadvantage can be avoided if the burner pipe is designed as a venturi pipe, shown in Figure 1b, such as used for measuring purposes in fluid mechanics. From the narrowed center part, the diameter must again increase gradually to the original size with a slope of 7 degrees; in this way 80 percent of the pressure drop caused by the constriction is regained, and a considerably better mixing of air and coal dust is obtained. The resistance caused by the cross-sectional reduction amounts to between 12 and 24 in. W. C.

To keep this loss as low as possible without loss of air velocity, and to reduce the load on the blower, the burner pipe must be made relatively large, corresponding to a velocity of 4,000 f.p.m., and must be equipped with a conical piece before the narrowing (Figure 1b). The diameter of this conical piece is calculated based on air velocity; the length is approximately 20 in. It is fastened with two sets of three bolts each. Because of this conical design, the coal-air mixture is accelerated to an end-velocity of 8,000, 16,000, or 24,000 f.p.m., in spite of the friction loss, from a beginning of only 4,000 f.p.m., requiring a lower pressure at the blower.

As seen in Figure 1b, the coal-air mixture will leave the burner pipe in a direction determined by the conical piece of pipe. The flame will not fill the entire cross section of the kiln, but approximately two-thirds of it. Nor does combustion take place over the entire cross section.

As is known from tests made by *Gygi*, the maximum concentration of oxygen is in the outer zone of the flame. While the inside contains unburned gases which do not burn until later, the secondary air and draft air sweep along the outside of the flame, where the most intensive combustion takes place. With the described burner pipe design, the coal dust will immediately reach the highest oxygen content in this zone, whereby combustion is intensified and the flame is shortened. This results in a lower exit gas temperature and a coal saving.

However, intensifying the combustion by pulling the flame back can be done only within limits, due to the danger of melting the nozzle. Experience has shown that the actual flame should be 10 in. away from the nozzle, and the velocity of the coal-air stream should exceed the flame propagation. Cases are known in which backfiring has melted the entire burner pipe clear back to the hood in less than 10 seconds. The

*Within the Heidelberg Portland Cement Company, Heidelberg, Germany, Wilhelm Anselm advanced from operations engineer to director of its Weisenau plant and was subsequently appointed to the management of the Perlmooser Cement Company in Vienna, Austria. After World War II he established himself as a consulting engineer for the rock and clay industries. In this capacity he did outstanding work for many well known companies in several countries. Mr. Anselm passed away on September 27, 1955. This article, *Wege zur Rationalisierung in der zementindustrie*, translated from *Silikat Technik*, Vol. 6, No. 12 (December, 1955), is the published version of a paper he delivered in July, 1955, at Nienburg. C. F. C.

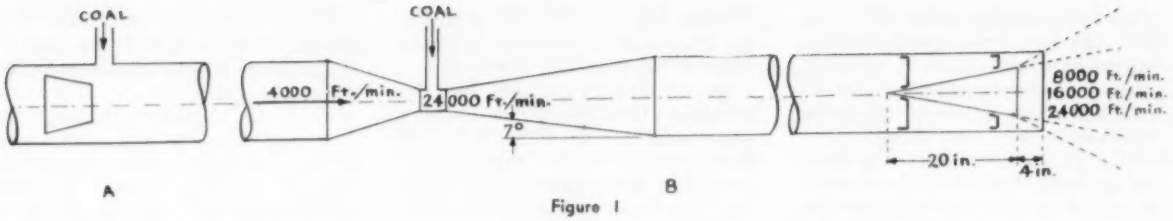


Figure 1

speed of propagation, which must be exceeded, is 4,000 to 5,000 f.p.m., and the nozzle-velocity must never be below this when coal is used as fuel.

Most defects in kiln operation are caused by incorrect velocity and pressure of injection; the flames are too long, and the exit gas temperatures too high. The modern way is to increase injection velocity. This procedure causes another difficulty to appear, namely maintenance of the lining by means of coating. It is necessary to improve the coating, as one of the most important factors in kiln operation, by changing the analysis, by reducing the variations in raw mix, and by higher fineness of the coal or mix.

In general, it is possible to control the coating by the chemical approach only. Even during the starting of the kiln care must be taken to have the raw mix show a low lime content, especially for a mix which gives a low liquid content. If at the same time bauxite or even iron is added to the mix, and the coal is ground very fine from the start, it is possible to build up a coating of 4 in. in 12 to 24 hours. The importance of the coating must not be underrated. No kiln can be maintained properly without complete control of the coating; it is one of the conditions for increased production through intensified burning. What happens in the sintering zone, rather than at any other place in the kiln, determines this intensification. Economy which is not achieved by intensive combustion in the sintering zone can not be regained at any other place by whatever equipment, such as heat exchangers, etc.

The primary air blower, the nozzle, flame velocity, flame development, retraction of the flame, coating, and cooling of the discharge end are the most important factors in obtaining intensified burning. If the flame is pulled back as far as shown in Figure 2, cooling is the most important condition; the second most important is an efficient seal. In some plants an engineer or a technician does nothing but check the seals. False air is the cause of great fuel losses, and kilns must therefore be sealed as effectively as possible. A kiln should not draw in more than 650 cu. ft. per bbl. of clinker, an

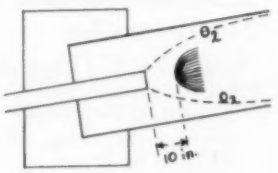


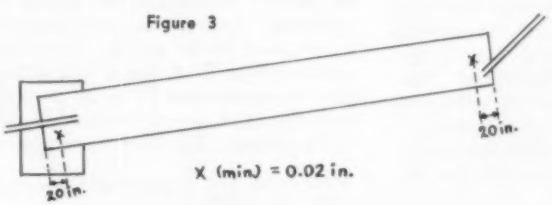
Figure 2

amount which may still be allowed for cooling.

For effective control of the draft it is necessary to measure it at two points inside the kiln (Figure 3), located 1½ to 3 ft. from each end. Since the rotary kiln is lying on a slope of 3 to 4 percent, the two ends of the gas column in the kiln will have an elevation differential of 10 to 15 ft., depending on the length of the kiln. The natural draft created by this column equals the friction loss (this is sufficiently accurate for kilns of any length), so that identical drafts, a minimum of 1/50 in. W.C. must be read at the two places in a correctly working kiln. These draft conditions are the foundation for intensified burning by means of flame retraction.

Air-Quenching Cooler Experience is now available covering some 250 air-quenching coolers; due to recent technical improvements, the results obtained have been materially improved during the last five years. But the advantage of quick cooling is already proven, from practical experience with clinker grinding which leaves the kiln insufficiently cooled. Such clinker cannot be ground with gypsum, which looses a part of its crystal water at temperatures above 250 deg. F., sets quickly in contact with moisture, and coats the mill.

Figure 3



By using the new air quenching coolers it is now possible to cool the clinker to 70 deg. F. The principle of this cooler is shown in Figure 4. The air from the cooler fan is blown into two zones; a part of it is withdrawn as secondary combustion air, the balance being wasted as exhaust at 250 to 400 deg. F. The utilization of this exhaust for drying of raw materials is not recommended, since auxiliary heating cannot be avoided in any event.

The grindability of quickly cooled clinker is generally better, and certain results can be obtained in its

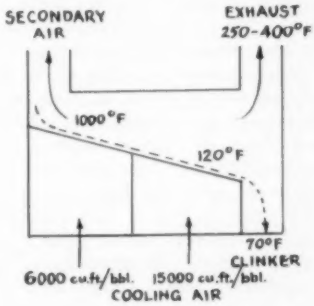


Figure 4

dependability on composition. The maintenance costs amounts to about $0.004 per bbl. for rotary coolers and only $0.0013 per bbl. for air-quenching coolers, calculated as 5-year averages. The power consumption is 0.44 kw.-h. per bbl. for rotary coolers and 0.49 kw.-h. per bbl. for air-quenching coolers.

In many cases the exhaust damper may be kept closed, so that all the cooling air is reclaimed as preheated secondary combustion air. While primary air should be cold for cooling of the nozzle, the secondary air should be as hot as possible. By closing the cooler exhaust damper, it is possible to improve the utilization of an air-quenching cooler by 80 to 89 percent.

It is not as yet clear whether quick cooling through the corresponding temperature interval actually has any influence on the

glass-and-crystal-phase of the clinker. Although tests with various quenched clinkers showed no influence, the results cannot be generalized since the influence of clinker composition was not studied.

The rotary cooler is inferior to the air quencher because it is impossible to seal it so effectively that no false air is sucked in. To this defect should be added the difficulties with refractory lining, wear on rotating parts, and the relatively lower efficiency which is inherent in the rotary cooler.

Heat Exchanger Technical developments in Europe are characterized by efforts to reduce heat consumption, since the price of coal is about the same as the price of cement. In America coal costs only half as much as cement, and reduction of labor consumption takes first place. For more rationalization, however, we, too, must economize on labor use. Modern cement plants in Europe operate with 0.17 to 0.25 man-hours per bbl., depending on the size.

When operating kilns with high exit gas temperatures, it is necessary to install heat exchangers. At the same time, all kiln tightening must be checked, since false air is the most important source of heat loss.

In spite of higher fuel consumption, wet-process plants have so far operated more advantageously than dry-process plants, also cost-wise. Wet plants were not exceeded in economy until the double-pass Lepol kiln reached a heat consumption of 560,000 B.t.u. per bbl.

However, even in single-pass Lepol kilns it is possible to reduce heat consumption to less than 660,000 B.t.u. per bbl., when the infiltration of false air is checked by efficient tightening. (In a measured case the false air amounted to 30 to 36 cu. ft. per bbl., and in the stated example, 21 cu. ft.) In this way the power consumption of the draft fan will be lowered and the heat on the traveling grate in the drying chamber will be better utilized; and it will be possible to bring the heat consumption of a kiln which uses 750,000 to 800,000 B.t.u. per bbl. down to the minimum heat consumption even without the double-pass system.

One of the most recent heat exchangers, the Humboldt Suspension Preheater, is at present used in six or seven plants in Germany. The method of blowing dry raw meal into a cyclone goes back to a patent issued in 1928. Tube mills, combined with drying in cyclones, are also being used.

Good heat transfer is obtained in the Humboldt Suspension Preheater because the gases are exposed to a large surface, produced by fine grinding. It is possible to obtain a heat transfer of 225,000-265,000 B.t.u. per sq. ft. on the traveling grate, due to the heat-bridges resulting from contact (Figure 5), whereas the raw material grains are so far

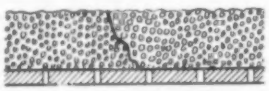


Figure 5

from each other in cyclone-drying, that no point-contact takes place. Aside from this fact, these small grains are moving along with the gases and have no speed relative to the gases whereby heat can be exchanged. The grains remain for only 10 to 20 seconds in the cyclone. This time is insufficient for calcination, for which at least 3 minutes must be available. In order to prolong the duration, a newly designed heat exchanger, which is now being installed for the first time, provides for introduction of the raw material from below through a slowly rotating feed screw, so that it is kept in contact with the gases for a longer time. This design is rather promising, although both for this and for the Humboldt Suspension Preheater the dust problem presents considerable difficulties.

It is now realized that no more than 1 percent of the clinker production should be blown out as dust loss, and that effective dust collection can be obtained only by the expensive electrostatic method. So much dust is deposited on the bed of nodules on the Lepol grate that it sometimes becomes necessary to loosen the bed with water-cooled rakes. After having been abandoned for some time, such rakes are now again being installed. A modern double-pass Lepol kiln operates with a dust loss of 0.8 percent, which may even be reduced to 0.2 percent of the clinker production if the dust is collected between the two passes.

Electrostatic dust collection is not practical in connection with Suspension Preheaters, since it requires definite moisture contents and temperatures. According to *Smith*** optimum electrostatic precipitation takes place at 20 percent humidity and 400 deg. F. A Lepol kiln delivers dust containing 15 to 20 percent moisture, and a wet process kiln 30 to 40 percent. The dust contained in the gases from the Suspension Preheater contains no moisture, and its temperature is about 480 deg. F. Attempts to make the dry raw meal suitable for electrostatic precipitation by injection of water have failed; dust and moisture pass in two separate streams through the dust collector without mixing. To solve this problem, an aerosol would be required, *i.e.*, a fine atomization of the water molecules in the air, or at least a 30-ft. long chamber in order to attain a certain mixing of dust and moisture through turbulence. Therefore, tests were made with glass wool filters which can endure temperatures of 480 to 580 deg. F. However, the glass became brittle when the dust was shaken off, and the life of this filter was only about 3 months. Maintenance cost became too high to make it economical.

Attempts have been made recently to exchange heat in an operationally advantageous way in a shaft charged with nodules. The nodules were made in a disc-nodulizer as developed in Czechoslovakia. It is possible to make uniform nodules of a diameter of from 0.20 to 0.30 in this disc nodulizer, even from unplastic raw materials such as 60 percent limestone and 40 percent blast-furnace slag.

As shown in Figure 6, the nodules are pushed into the shaft by means

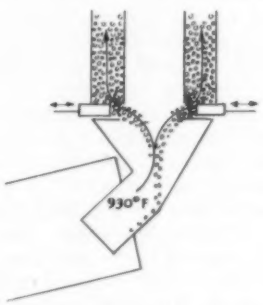


Figure 6

of 12 circumferential pistons, without being crushed. The exhaust from the kilns is carried in counterflow through the charge of nodules. This method functions satisfactorily until a passage forms through the nodules; the entire exhaust will then pass through these paths of least resistance without releasing its heat and dust. Tests have also been made with a Fuller grate arranged like a Lepol grate, but they did not lead to satisfactory results since the nodules were ground to pieces. The method is, however, usable with limestone or similar material of greater hardness.

**Industrial and Engineering Chemistry, 1949, page 1428.

EFFICIENCY OF GRINDING

Single vs. Compartment Mills The subject of grinding is still largely unexplored, as shown by the general uncertainty in regard to degree of filling, grading of media, speed of rotation, screen size, etc. The old 8- by 40-ft. or 8- by 43-ft. three-compartment mill is a compromise between a preliminator and a fine-grinding tube mill, and it is necessary to adjust the speed accordingly. If the trajectories of large balls of various sizes are studied by means of a model at identical rotational speeds, it is realized that optimum work is performed in none of the three chambers. Crushing action is required in the first compartment for breaking the largest pieces of the load; cascading blows are given in the second compartment; and attritional action takes place in the third. (Figure 7) However, it can be shown by means of a model that these desired actions are not obtained.

Contemporary development in grinding technology is in the direction of larger units, just as for rotary kilns, which may be designed for capacities up to 12,000 bbl. per day. For mills this development is based on the fact that the first cost of a 300-bbl. mill is less than that of three 100-bbl. mills, and further that the power consumption per barrel is lower for large mills than for small ones. This has not been realized before. The somewhat greater amount of power used to lift the balls is by far outweighed by higher output. Cement mills of less than 9-ft. diameter should therefore no longer be installed. By using a mill of larger diameter, a saving is realized in crushing. A mill over 9 ft. in diameter will break pieces of matrial larger than 2 in., even 3 in., in the first compartment.

If several smaller mills are available (such as 6½ ft. by 40 ft.), it is practical to use these for fine grinding only, and one large mill for primary grinding. The most rational principle is separate primary and fine grinding.

The primary mill, which requires a crushing action, must operate at a higher speed than the fine grinding mills.

The speed of the individual mills depends on the critical speed at which the balls are carried around by centrifugal action without providing any cascading or attrition. This critical speed is expressed as follows:

$$n_{crit} = \frac{265}{\sqrt{d_i}}$$

where d_i is the inside mill-diameter in inches.

The normal speed of preliminators is 72 percent of this value; that of compartment mills, 68 percent; and that of fine grinding mills, 64 percent.

The degree of filling in the mills has been increased. In compartment mills the first section is filled 33 percent with grinding media, and the second and third sections 30 percent. Preliminators of 11-ft. inside diameter and 15 ft. long operate with a 39 to 40 percent filling and at higher speeds, such as 74 to 76 percent of critical. This means more power for a relatively smaller volume and makes a special mill design necessary, as shown in Figure 8. The

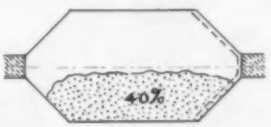
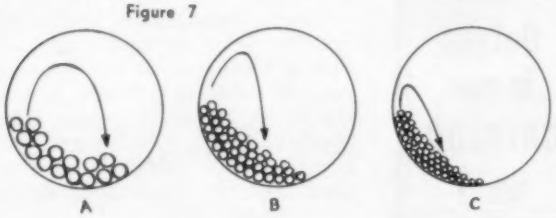


Figure 8

shells of these mills are made conical in order to minimize the wear on the grinding plates and maintain a high degree of filling.

Corrugated linings have a different coefficient of friction than smooth linings, and should be installed in the first compartment of compound mills in order to lift the balls higher. However, in separate preliminators, whose speed can be adjusted correctly, it is unnecessary to install corrugated linings, since the friction coefficient may be taken into consideration in the determination of the speed. According to the latest experiences, plates with waffle pattern are most advantageous for both raw and finish mills. They are installed in all compartments. The waffle pattern is raised approximately 0.6 in.

Figure 7



Wear has been the subject of some erroneous thinking. As a principle, wear-resistant grinding plates with a Brinell hardness of 500 should be used, whereas the grinding balls should not exceed a Brinell hardness of 300. Since replacement of the grinding plates requires more time and effort, it is economical to keep the wear on them to the minimum even at the expense of grinding balls.

The present system of measuring the wear in pounds of steel per bbl. of raw material or clinker produced does not give the whole picture, since the grindability and the fineness of grind—in other words, the *grinding effort*—is not considered. Easy grinding clinker requires 3.5 kw.-h. per bbl., while hard-to-grind clinkers may require 7 kw.-h. for the same fineness. Under actual conditions, Type III cement requires 12.5 kw.-h. per bbl., and Type I cement 6 kw.-h. per bbl. for grinding. If, therefore, the wear in pounds per bbl. is considered in relation to the consumed energy in kw.-h. per bbl., then the correct comparison in pounds per kw.-h. is obtained. The following figures for wear may be used as a guide: for balls 0.03 to 0.035 lb. per kw.-h., and for grinding plates after 100 hours, 0.0022 to 0.0044 lb. per kw.-h., depending on the quality.

Closed-Circuit With Air Separation Formerly compartment mills were preferred, but closed-circuit mills are now gaining in importance. This does not include air-swept closed-circuit mills, because of their higher power consumption of 7 to 8 kw.-h. per bbl., and only the mills with elevators are considered. The principle of this circuit is shown in Figure 9.

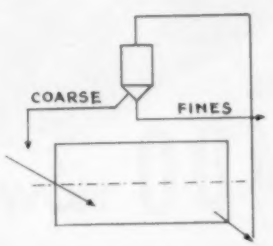


Figure 9

The previous rejection of closed-circuit was based on a phenomenon, which, according to *Andreasen,* also shows up in particle size sedimentation: namely, that the larger grains carry the smaller grains with them, thus eliminating them from determination and separation.

In the *Rosin-Rammler* diagram, in which the residue is plotted as

ordinate and the grain size as the abscissa, the curve showing particle size distribution therefore does not start from the origin; it begins at approximately 2 microns and turns into a straight line at 7 to 10 microns. But the straight line should theoretically reach into the range of the fine particles.

Since, according to *Andreasen*, the residue-curve does not identify the particles below one micron, it cannot be used for surface determination either. Surface area determination by the *Blaine* apparatus is, likewise, not sufficiently accurate in all ranges; at higher surface areas (over 2,000 Blaine) this test gives values which are too low, so that at 4,000 Blaine it is already necessary to add 15 or 20 percent.

To check these circumstances we developed an instrument five years ago, with which it became possible to isolate the particle range between 0 and 2 microns. This instrument consists of a glass cylinder, filled with alcohol and containing an elutriated two-gram sample of cement of a certain particle range (such as 0 to 1 micron, 1 to 2 microns, 2 to 4 microns, 4 to 8 microns, 8 to 16 microns, etc.).

The precipitated cement sample is whirled by a ball, acting as a piston, and the turbulence in the space between the ball and the glass wall keeps the small particles in suspension. The finest grains conglomerate into a cloud at the place of transition between the turbulent and laminar zones, and it can be microscopically demonstrated that these are between 0 and 2 microns.

If the cloud is stirred and alcohol is added drop by drop in amounts determined exactly according to Stoke's law, it will be possible to decant particles of 0 to 1 micron and other size fractions. Based on these determinations, the particle size distribution curve in the *Rosin-Rammler* diagram follows a straight line.

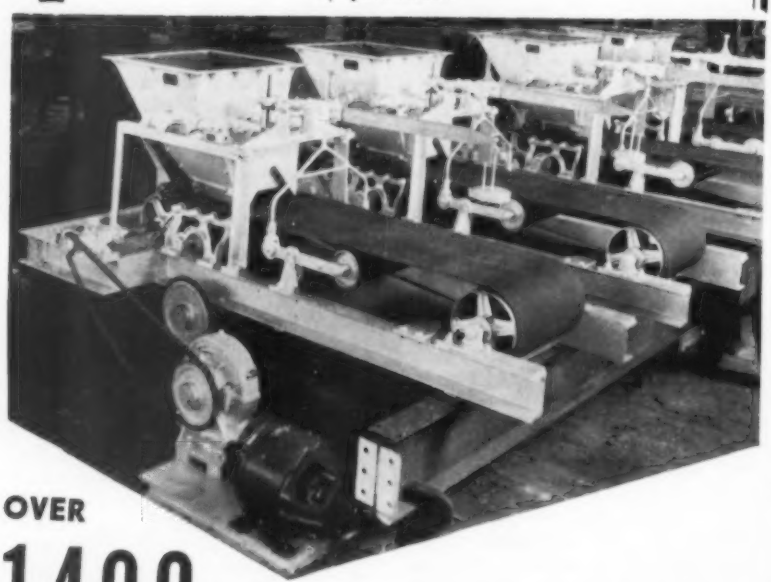
These considerations may be applied to the function of a closed-circuit grinding system. The strength of closed-circuit cement was formerly lower than that of open-circuit cement, while its grain distribution corresponded to the *Andreasen* curve. The finest grains will be carried along by the coarse grains. This can be proved by screening the product after a closed-circuit preliminator or after the first compartment in a compound mill, a procedure by which a very favorable value for the residue of less than 1 percent is obtained.

However, if the surface area is determined, it shows only about 1,000 Blaine; in other words, the product contains no fine particles. Since more fine particles are produced in a relatively longer mill, it is only by more frequent circulation that the particle size distribution—corresponding to the Andreason curve—can be turned into a straight line. The circulating load of the closed circuit system must therefore be increased in order to approach the particle size curve and the strength obtained with the compartment mills. Closed circuits are now operated with 300 percent circulating load for low-grade cement, 500 percent for Type I cement, and 1,000 percent for Type III cement, whereas formerly only 150 to 200 percent circulating loads were used.

Special formulas have been developed for fixing the circulating load. Five or six individual measurements must be made in different parts of the circuit, the sieve analyses being insufficient since sieves separate only a part of the actual grain composition. The circulation must be in-

(*Continued on page* 146)

4 "ACES" — **SCHAFFER POIDOMETERS proportioning gypsum and clinker in plant of a large cement producer.**



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Cement-Producing Capacity Soars in Southern California

Another ON THE SPOT Report

WHILE the portland-cement industry nationally is currently engaged in a tremendous plant-expansion program, southern California mills are in the midst of even greater enlargements

By HARRY F. UTLEY

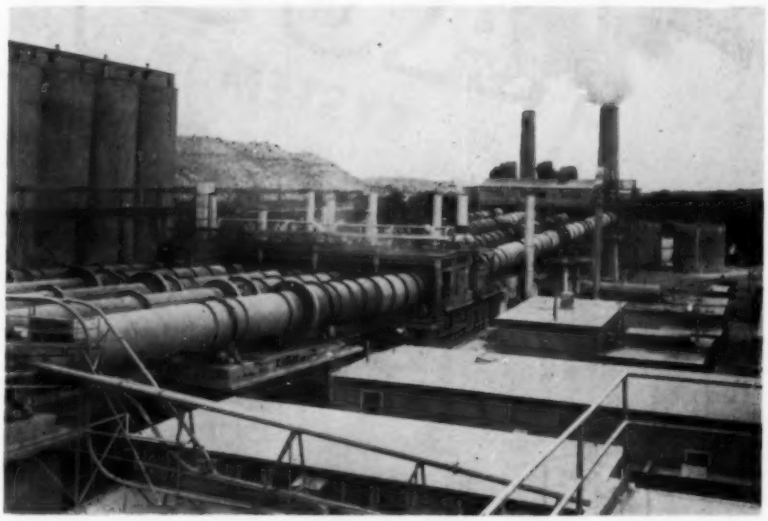
to keep ahead of a construction boom that is pacing the nation in its magnitude.

Figures indicate that the program (1955-1956), outside the southern California area, will add about 23 percent to cement manufacturing capacity as it existed at the beginning of last year.

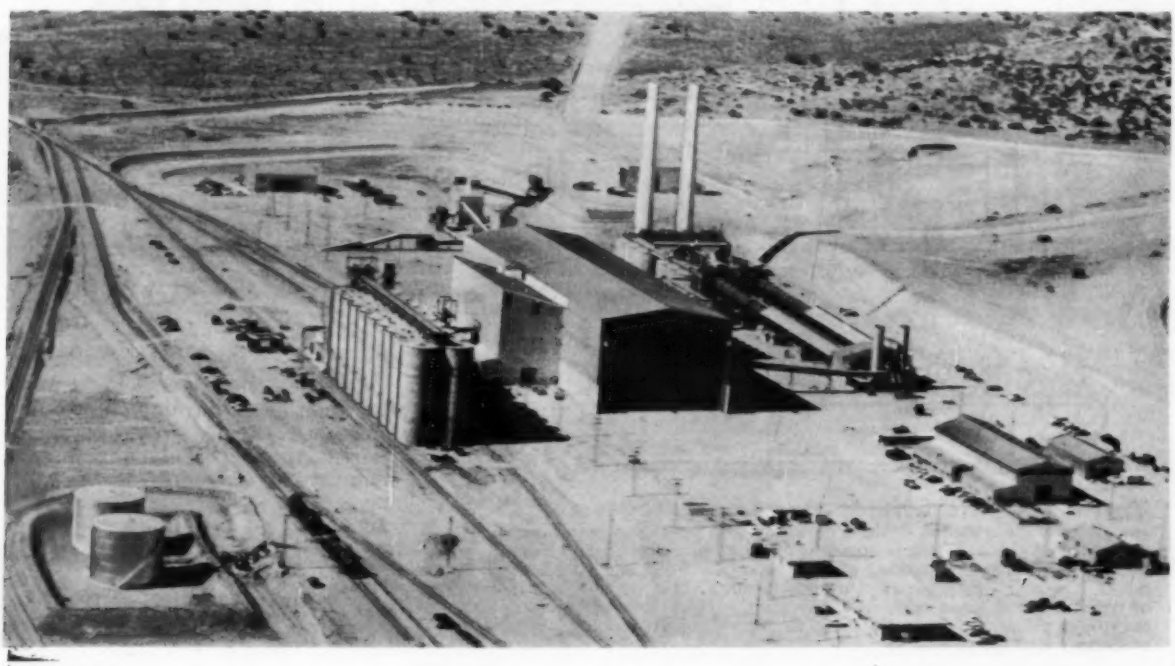
The industry in southern California during this 2-year period, however, is boosting clinker-producing capacity by a whopping *40 percent!*

All five of the long-established plants in southern California have important improvements under way at the moment. Each of two entirely new plants—that of the California Portland Cement Company near Mojave, and the Permanente Cement Company near Lucerne Valley—has an initial annual capacity of about 2,000,000 bbl. The Mojave operation went into production late in 1955, and the Permanente plant will be producing before the end of this year.

Combined capacity of the seven plants, it is estimated, will be about 28,000,000 bbl. by the close of 1956, compared with approximately 20,-



Nine kilns, the last of which was fired in April, 1956, at the Southwestern Portland Cement plant at Victorville, Calif., can now turn out 6,000,000 bbl. of cement annually.



This new plant of the California Portland Cement Company near Mojave, a 2,000,000-bbl. per year operation, went into production late last year.

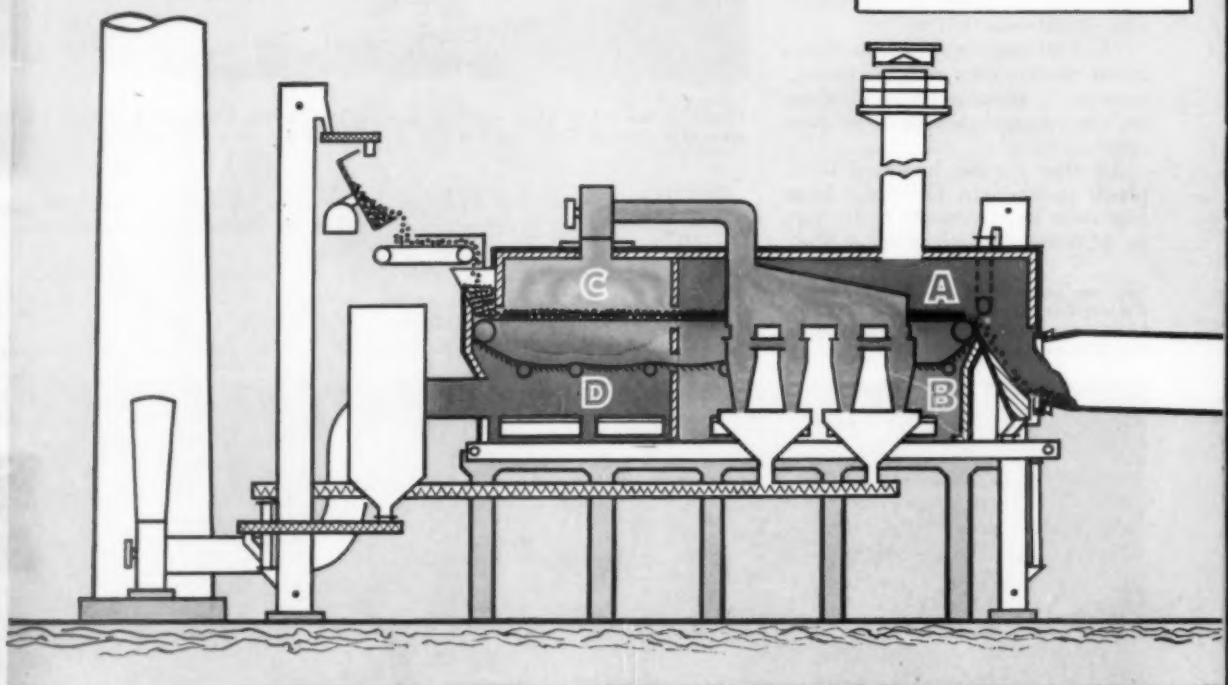
THE ACL SYSTEM

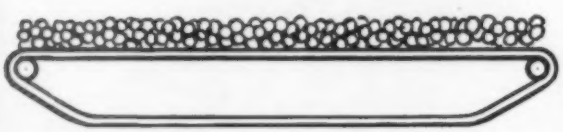
Cuts Cost

...puts you in a better competitive position—HERE'S WHY!

LESS DUST LOSS

Double pass of gases through traveling bed of pellets reduces dust loss below 1% of feed weight without an additional dust-collecting system. Valuable processed material is saved. Dust load of exhaust gas is lower than in any other system.



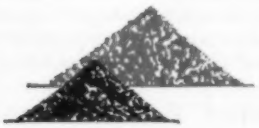


Traveling Grate Affords Many Advantages Because feed volume on traveling grate is constant, kiln operation is uniform and more efficient. There is no segregation of mix. Pelletizing locks in and maintains proportions of components. "Flushing" is eliminated, "ringing" minimized. Voids between pellets permit escape of moisture and gases without fluidization of bed. Because clinker maintains pelletized characteristics, it moves through the rotary kiln uniformly and burns easily.

EFFECTIVE DUST FILTRATION . . . efficient heat transfer . . . more uniform, better burning clinker . . . substantial savings in fuel, power requirements, space and manpower . . . maintenance economy—all these im-

ALLIS-

# of Producing Cement

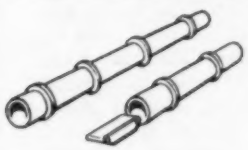


LESS FUEL

Fuel consumption for ACL systems now in operation averages 600,000 Btu per barrel of clinker. Conventional long, dry-process kilns range from 750,000 to 1,000,000 Btu. Powdered coal, fuel oil, natural or coke oven gas may be used.

LESS POWER

The ACL system for burning cement clinker requires about 2.3 kwhr per barrel of clinker for operation of kiln department. This is about one-third less power than required by rotary kilns using other preheating systems.



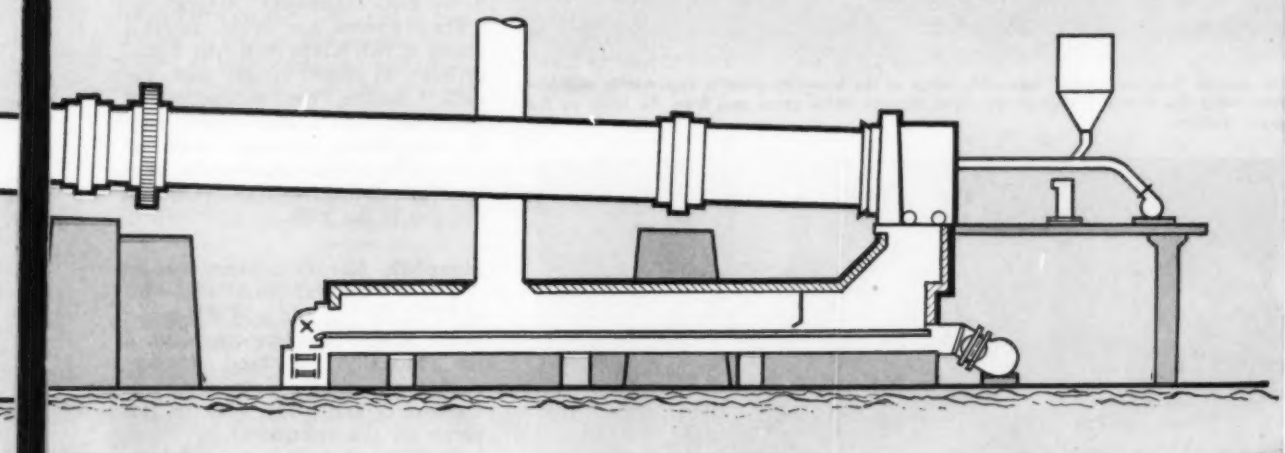
LESS SPACE

Entire ACL system—grate, kiln and cooler — is about 40% shorter than conventional long kiln installations. The totally enclosed traveling grate is about as high as the average kiln feed end housing.

How the Double-Pass System Works

Partial calcining and dust reclamation take place as hottest gases pass through the pellet bed on traveling grate. Gas temperatures are reduced from about 1800 to 500 degrees in this first pass (*A* to *B*). Next, gases pass through cyclones where larger dust particles are removed, and carried back to pelletizer. Final dust filtering takes place as gases pass through moist pellets on feed end of grate. In the second pass (*C* to *D*) gas temperatures are further reduced.

ACL is an Allis-Chalmers trademark.



portant advantages, and many more, are yours with the ACL system.

New Bulletin Available A new bulletin, describing the ACL system, Allis-Chalmers kilns and kiln auxiliaries, is ready for distribution. To get your copy, see your nearby Allis-Chalmers representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 07B8431.

58 Installations by Lellep Licensees since 1950

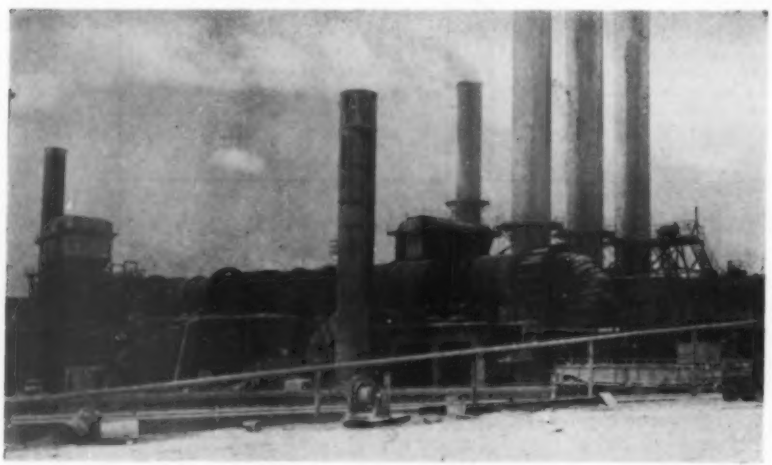
CHALMERS

A-5108

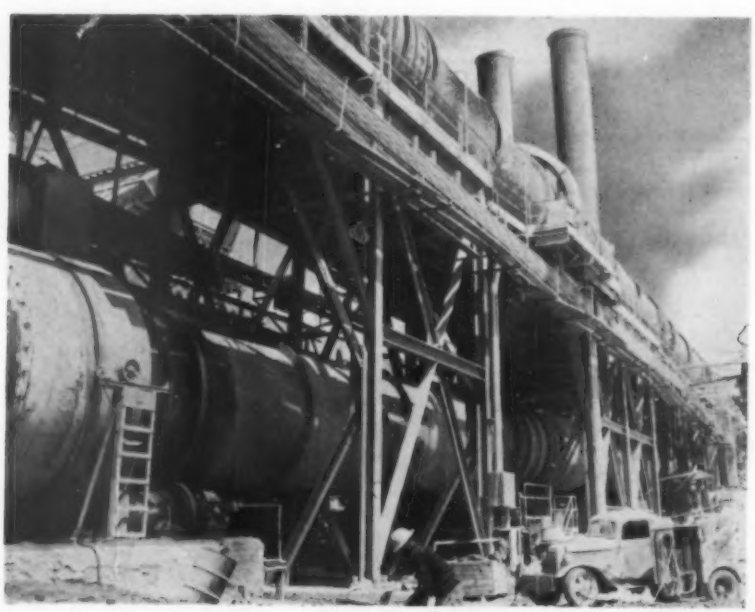
000,000 bbl. at the start of 1955. Shortages have existed in southern California for the last five or six years, and with this added capacity the supply should be adequate, to say the least, by the end of the year.

California-Mojave Nor will there be any easing off, apparently, in 1957 as far as capacity increase is concerned. Late in April of this year California Portland Cement officials announced that the new 2-kiln Mojave plant, still in its first year of production, would have its potential increased by still another 3,500,000 bbl. through the addition of three more kilns and other necessary equipment and structures. This project is expected to be completed during the latter half of 1957 and will cost in excess of $10,000,000, company officials reveal. The Mojave plant, a dry-process operation, at present has two 11- by 350-ft. Allis-Chalmers rotary kilns, equipped with Fuller coolers and a Western Precipitation C.M.P. dust-collecting system. No changes are being made in the capacity of California's Colton plant.

Permanente-Cushenbury Spokesmen of the Permanente Cement Co. are hopeful that the new Cushenbury plant near Lucerne Valley, Calif., will start turning out clinker in December, 1956. Footings and foundations were being poured early in May and a 'round-the-clock construction schedule is planned to rush the new 2-kiln wet-process operation to completion. James G. Hansen, who formerly supervised iron-ore mining at Kaiser Steel's Eagle Mt. mine, will be works manager. In addition to providing raw material for cement making, the Cushenbury limestone quarries will also supply flux stone to the Kaiser Steel plant at Fontana, Calif.



The unusual "over-and-under" rotary-kiln setup at the Monolith plant is apparent in this picture. Note the U-tube section at the right, through which gases pass from the lower to the upper portion.



Another view of the recently enlarged kiln at Monolith. The upper and lower barrels combined provide the burning efficiency equivalent to a large-diameter 600-ft. conventional kiln.

Southwestern Capacity at the Southwestern Portland Cement Company's Victorville plant jumped to an all-time high of 6,000,000 bbl. annually in April, 1956, when its ninth rotary kiln was fired. The new Allis-Chalmers kiln, 10½ by 330 ft., is the same size as No. 6, 7, and 8 kilns, which were installed at intervals of a year or so over the last six years. Instrumentation has been developed to a high degree for automatic kiln operation, primarily through Bailey advanced control systems.

All nine kilns have now been equipped with Fuller inclined-grate clinker coolers. Two new Allis-Chalmers 10½- by 16-ft. ball mills have also been installed recently on the finish-grinding side at Victorville. On the raw side, four Robins 5- by 8-ft. single-deck 50-mesh vibrating screens are being installed ahead of two Krebs dual-type liquid cyclones in closed circuit with the mills. Earlier, the company had established that a considerable gain in wet-grinding capacity could be effected by a somewhat similar pilot installation which returns only the oversize to the mills.

Monolith Clinker capacity was increased about one-third to 4,700,000 bbl. annually this spring at the Monolith wet-process plant of the Monolith Portland Cement Company with the enlargement of the No. 5 kiln. The kilns in this plant are unconventional in design, being preceded by rotary driers about 40 ft. long. The dryers are integral with and parallel to the kilns below, gases reversing at the feed end of the kiln proper through an elbow, or U-tube section, to enter the dryer.

Some years ago the 40-ft. long dryer section on the No. 1 kiln was increased to 115 ft., enabling that kiln to gain the recognized fuel economies, efficiency, and operating advantages of long rotary kilns. General satisfaction with the performance of this unit dictated the changes

in the No. 5 kiln, which now has the effectiveness of a 600-ft. long unit. This was accomplished by erecting a new 14- by 310-ft. combination rotary dryer and pre-calcining kiln extension directly above the existing 248-ft. kiln, which was rebuilt to diameters of 13 and 11 ft. The partly calcined stone from the discharge end of the upper rotary unit is transferred to the feed end of the lower kiln by scoops through an air-lock. A separate multiple-cyclone dust-collecting system was also installed on the No. 5 kiln.

Kilns No. 2, 3, and 4 continue to operate with the original 40-ft. dryer sections, and future expansion will probably involve enlarging these units in a manner similar to Kiln No. 5.

Stone is now ground to minus No. 4 mesh right at the quarry in a 13- by 11-ft. friction-driven ball mill of the company's own design, and the fine stone is transported in 11-ton capacity cars over narrow-gauge tracks directly to the raw-mill feed bins, a distance of about 3 miles. Mill department changes involving increased grinding capacity on both the raw and finish sides are also being planned as clinker output continues to increase.

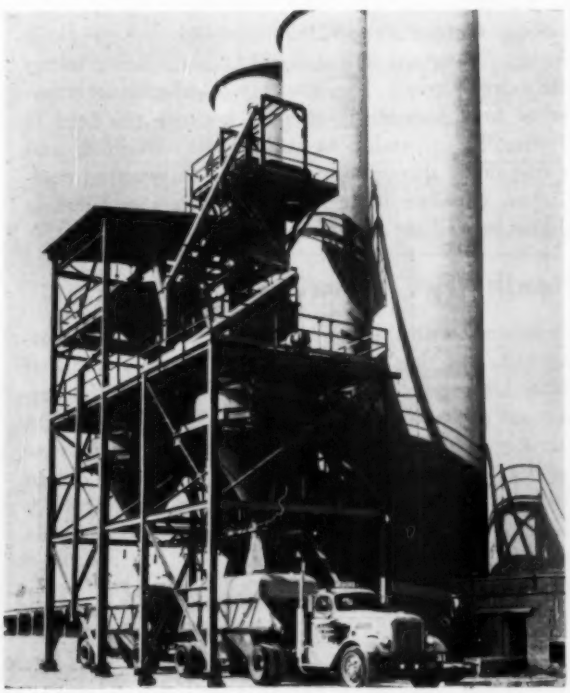
Riverside During 1955 and throughout 1956 the Riverside Cement Company is continuing to expand and modernize all phases of manufacturing operations at its Crestmore and Oro Grande plants.

Raw Material—At its Crestmore Division Riverside is tapping huge underground limestone reserves through the development of a mine of the room-and-pillar type. A tunnel approximately 30 ft. wide and 25 ft. high descends along the deposit on a 10 percent grade. From the access tunnel, underground rooms are being developed for the extraction of limestone. At completion, rooms will be 60 ft. wide by 90 ft. high, running the width of the deposit.

Performing this heavy-duty underground work are various types of custom-built machinery. Drilling in the rooms is performed by a 4-machine Ingersoll-Rand Jumbo drill. After the blasting operation the crushed rock is loaded into 30-ton, 350-hp. Kenworth electric trolley trucks. Two special 93-M Marion, 3-cu. yd. shovels with short boom and dipper sticks are currently in use in the underground rooms. The Kenworth trucks haul the rock from the underground rooms to the crusher at the surface; LeTourneau-Westinghouse 18-ton Tournarockers

A 3-cu. yd. electric shovel loads one of the electric trolley trucks in Riverside's new underground limestone mine at Crestmore.

Right: The new dual-hopper bulk-cement loading station at Riverside's Crestmore operation. The company operates about 50 truck-trailer delivery units. One of the various types is shown here.



Below: The new employees' change house at the Crestmore plant. Note the tropical landscaping and the interesting design on the front wall.

FULLER PREHEATER
Humboldt Suspension Type

GET ALL THE FACTS!

The suspension preheater, introduced and developed by Klockner-Humboldt-Deutz AG, of Koln, Germany, and applied to the American cement industry by Fuller Company of Catasauqua, Pennsylvania, gained an impressive following in the year 1955. In North America, ***9 new units*** were sold, and ***1 unit*** put into operation. Outside of North America, ***7 new units*** were sold, and ***1 unit*** put into operation. The total of all units sold now stands at ***34; 13 of these sales have been to American companies.*** The first unit was started at the end of 1950, in the plant of Norddeutsche Hutte, at Oslebshausen, Germany, and it is interesting to note that the remainder all have been sold or installed between early 1953 and the present time.

American experience has confirmed several important advantages that account for the acceptance accorded this method:

Rapid and efficient heat transfer

A design feature of the Fuller-Humboldt system causes the dry pulverized raw material to be dispersed in the kiln exit gas stream. The *most rapid and efficient transfer of heat possible* is effected because the feed is alternately suspended in the stream, collected, and re-suspended through several stages. Substantial equilibrium between material and gas temperatures is almost immediate at each stage.

Flexibility . . . increase in output

Experience with the four American units now operating indicates that in addition to a potential for fuel reduction superior to other known methods, the suspension preheater offers unique flexibility. At a slight sacrifice of fuel economy, the operator can take advantage of this *flexibility to increase output beyond design capacity* by as much as 30%. "Design capacity" for the preheater-equipped kiln already represents an improvement in the neighborhood of 70% above a kiln with recuperator-type cooler only. It is possible to obtain this additional output and maintain proper gas temperatures for fan and dust collectors through by-passing part of the gas stream. Since all of the raw feed is suspended in the gases in the course of the preheating operation, the matter of gas velocity in the kiln (caused by burning more fuel and feeding more raw material) is not critical.

Experience

Operating experience confirms a fact related to matters of efficiency and flexibility that is obvious to all experienced operators; namely, that fuel rates, in terms of absolute values, have no meaning unless all other pertinent facts are known. The variables in each application, such as the nature of the raw material, composition of the mix, whether the kiln is operated for maximum efficiency or maximum production, and whether or not part of the gases are to be used for waste heat power production, are all important factors. Fuel rates range from 600,000 Btu/barrel to as high as something above 850,000 Btu/barrel. Specifically, one installation consisting of an orthodox preheater-kiln combination is operated to take advantage of the flexible nature of the system. The kiln's productive capacity is now more than 100% greater than before application of the preheater, and fuel rate is about 660,000 Btu/barrel. Another system involves a hard burning mix and the use of part of the kiln exit gases for waste heat power production. Under these conditions, the fuel rate is about 850,000 Btu/barrel, but even so, a saving of 500,000 Btu/barrel has been effected.

With respect to clinker quality, the output of the units in current operation has been consistently high, and in all instances, of improved density and lower free lime as compared with clinker produced by other

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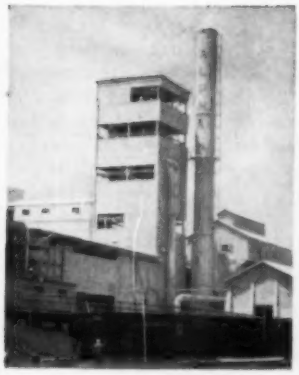
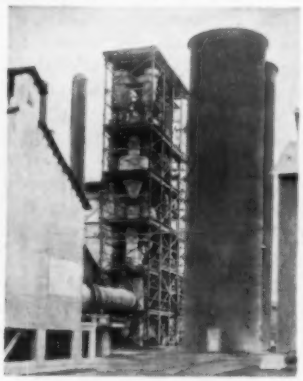


Alpha Portland Cement Company, Catskill plant, Cementon, N. Y. In operation.

Lehigh Portland Cement Company, Fogelsville, Pa. plant. Photo taken during erection. Now in operation.



Allentown Portland Cement Company, Evansville, Pa. plant. In operation.

kilns at the same plants. Segregation is no problem, because the nature of the system causes recycling of the material within the circuit within seconds of introduction, so that the formation of the compounds is in no way impaired.

Operation from burner floor

No additional labor is required, and it is entirely practical to operate the preheater from the burner floor.

Maintenance at minimum

Because of the simplicity of design, material of construction, and lack of moving parts, *maintenance requirements are minimum.* The moving equipment comprises the fan, dust conveyor, and feed conveyor, all of which operate in normal temperature ranges. Operations at the plant of Allentown Portland Cement Company, Evansville, Pa., where the first American installation was made by Fuller Company, have been closely observed since 1953. In the approximately three years' operation, it has not been necessary to do more than make minor repairs or adjustments. It was also confirmed here and on later installations that operation from the burner floor is entirely practical.

In summary, the Fuller-Humboldt Preheater *offers:*

1. Superior efficiency.
2. Flexibility that permits production well in excess of design capacity.
3. No extra labor for preheater operation.
4. Maintenance requirements at a minimum.

Fuller Company has broad operating experience both at home and abroad. Fuller's engineers have first-hand design, erection, and operating experience to offer in studying your requirements. We urge that you let us cooperate in investigation of all the facts and factors before you make your decision.

FULLER PREHEATERS INSTALLED* OR ON ORDER

*Allentown Portland Cement Company
Evansville, Pa.
1 PREHEATER

*Alpha Portland Cement Company
Cementon, N. Y.
1 PREHEATER

*Lehigh Portland Cement Company
Fogelsville, Pa.
1 PREHEATER

*North American Cement Corporation
Hagerstown, Md.
1 PREHEATER

Huron Portland Cement Company
Alpena, Mich.
2 PREHEATERS

Nazareth Cement Company
Nazareth, Pa.
1 PREHEATER

Medusa Portland Cement Company
Dixon, Ill.
3 PREHEATERS

Ideal Cement Company
Boettcher, Colo.
2 PREHEATERS

Whitehall Cement Manufacturing Co.
Cementon, Pa.
1 PREHEATER

FULLER COMPANY GENERAL MINERALS

Fuller
pioneers in harnessing AIR

. . . DESIGNERS AND BUILDERS OF BETTER CEMENT-PLANT EQUIPMENT FOR THIRTY YEARS . . .

3434 PB-ST

are used in transporting limestone from the access tunnel to the crusher. The new mine will supply the requirements of the mill, thus eliminating the more costly hauling of raw material from the company's outlying quarries.

At its Oro Grande plant the company is currently developing a new major source of raw material. The Sparkuhle limestone deposit, located approximately 4 miles from the plant, is one of the largest deposits in the southern California area.

Grinding—In order to obtain a better process balance between the raw grinding, burning, and finish-grinding departments, other changes and additions are being made at Oro Grande. To eliminate an excess of raw-grinding capacity, conveying equipment was recently installed to supply one of the raw-grinding mills with clinker, so that it may now be utilized either as a finish- or raw-grinding unit.

New equipment has been purchased, and engineering is under way for a 50 percent expansion of finish-grinding capacity. The new equipment will consist of two 12- by 17-ft. grinding mills driven by 1,250-hp. motors through F. L. Smidth Symetro gears. The mills will be supported on a single, centrally located tire aided by balancing antifriction bearings on the drive shaft, which is located at the discharge end of the mill. This additional cement grinding equipment is scheduled for completion early in the autumn of 1956.

Burning—Additional clinker cooling facilities were recently installed on the 125-ft. kilns at Oro Grande. This equipment consists of a drag-chain that moves the clinker over a grate through which cooled air is passed. On the 350-ft. kilns at Oro Grande a new conveying system consisting of a dragchain and belt conveyors was also recently put into operation. The new system picks up the clinker fines that fall through the grates of the Fuller coolers and those collected in the Multiclones attached to the cooler vent stacks and delivers them directly to the grinding mills. This reduces dust in the clinker storage and relieves the load on the clinker crane.

Power—For many years the Riverside Cement Company has employed the principal of waste-heat power generation at its Crestmore plant. Early last year a waste-heat power plant was completed and is supplying the Oro Grande plant with its power requirements. The power plant consists of five waste-heat boilers and two direct-fired boilers, all of which supply steam to two 7,500-kw. turbine generators. The waste-heat boilers are installed at the gas discharge end of the 350-ft. kilns. In addition to supplying steam for power generation, they also serve to increase the effectiveness of the dust collection equipment as the velocity and temperature of the kiln flue gases are reduced.

At Crestmore, power plant modernization and improvements are in progress which are designed for greatly increased dust collection efficiency. These alterations include the replacement of three of the present waste-heat boilers and one turbine generator. The new equipment will operate at 600 p.s.i. steam pressure and 825 deg. temperature. With the addition of the new Westinghouse 5,000-k.w. turbine generator, the power plant will have a total rated capacity of approximately 12,000 kw.

Storage—Construction is now in progress at Oro Grande for additional cement storage facilities. A new cement stockhouse will provide additional storage for 200,000 bbl. of the finished product. The new building will contain a hopper-bottom with sides constructed on angles of 45 degrees. A conveying system will be installed to permit recirculation of the product within the storage area. Fuller Kinyon pumps will be employed to convey cement to the stockhouse and from storage to the loading points. The new building will more than double existing cement storage facilities.

Bulk Cement Handling—In order to expedite the flow of bulk cement from the manufacturing plants to the market areas, additional bulk loading facilities have been installed. A dual hopper loading station installed at the Crestmore plant represents a 50 percent increase in bulk loading equipment. In addition, the company's bulk transfer facilities at San Diego have been more than doubled by the installation of additional storage bins, conveying equipment, and loading hoppers.

Office and Laboratory—A new office and laboratory building is under construction at the Oro Grande plant. The two-story building is of lift slab construction, with exterior walls of hollow gunite concrete. In addition to providing modern office space for plant personnel, the new structure will house a laboratory of ultra-modern design. The latter will be divided into three rooms: one for analytical chemistry, another for physical testing, and a third for sample preparation and design of concrete mixes. The chemistry section will contain custom-built furniture and special work areas for each analyst. Individual utilities available will include air, vacuum, natural gas, hot, cold, distilled water; there will be built-in refrigeration and constant-temperature ovens. A Model B Beckman flame photometer for alkali determinations will be installed.

The physical testing room will contain completely new apparatus, including a Hobart mixer and autoclave. The moist closet will be of ceramic tile and stainless steel, with complete humidity and temperature control. New crushers and pulverizers will be installed in the sample preparation room. A ¼-cu. yd. mixer will be used for concrete mix design work. The entire unit will be completely air-conditioned.

A new office and laboratory building is also being designed for the Crestmore plant. This laboratory, too, will contain the most modern testing apparatus available.

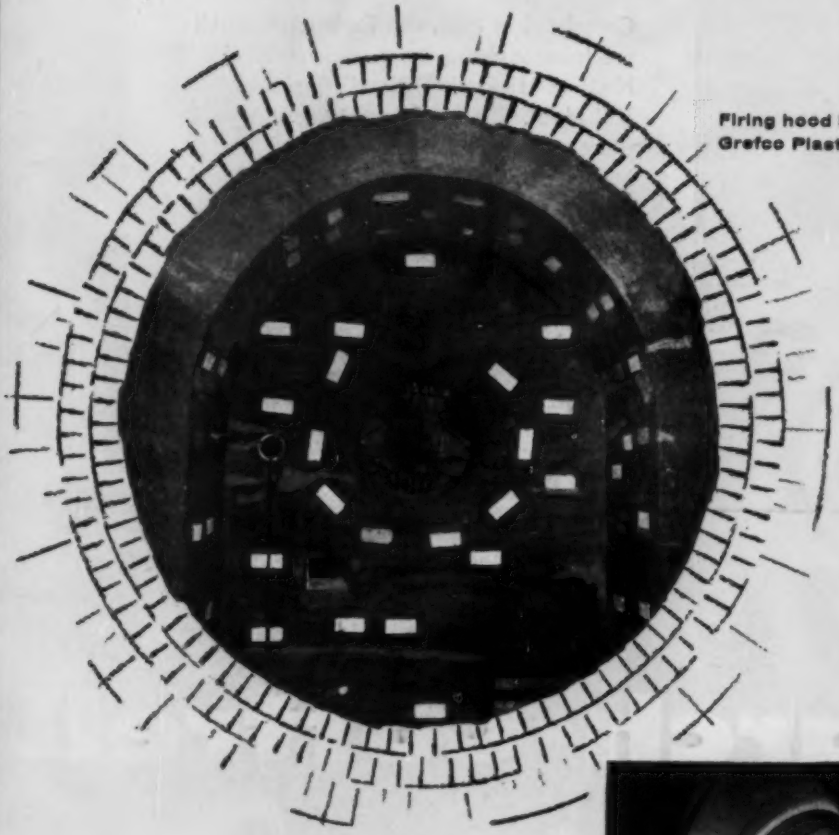
Employee Facilities—New change houses for both mine and mill employees were recently constructed at the Crestmore plant and are now in use. The new mill change building is of lift slab concrete construction. Walls are of hollow gunite and concrete block. The new employee facilities include marble shower and washroom partitions, individual lockers, chrome fixtures and stainless steel appointments throughout. The new Crestmore buildings are similar to those provided recently at the Oro Grande plant. In addition, paved areas are now provided for employee parking, and the general landscaping at both Riverside plants is being constantly improved with the addition of lawns, trees, concrete walks, and curbings.

Officials of Gypsum, Lime and Alabastine, Canada, Limited, Toronto, Ont., have announced two recent promotions.

F. W. Harvie, formerly manager of the Pacific lime division, has been appointed assistant to the executive.

W. M. Tully, recently manager, Gypsum, Lime and Alabastine division, British Columbia, is now British Columbia manager.

Alexander B. Fox, 49, was killed in the recent TWA airliner crash near Pittsburgh. Mr. Fox, a former University of Pittsburgh football star, was a sales division manager for the Lehigh Portland Cement Co.



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Completed in 1954, this Research-Cottrell precipitator cleans the gases from Kiln No. 5 of Missouri Portland's Prospect Hill Plant. The gases from this rotary wet process kiln pass from the kiln end housing, through the precipitator, induced draft fan and then up the stack.

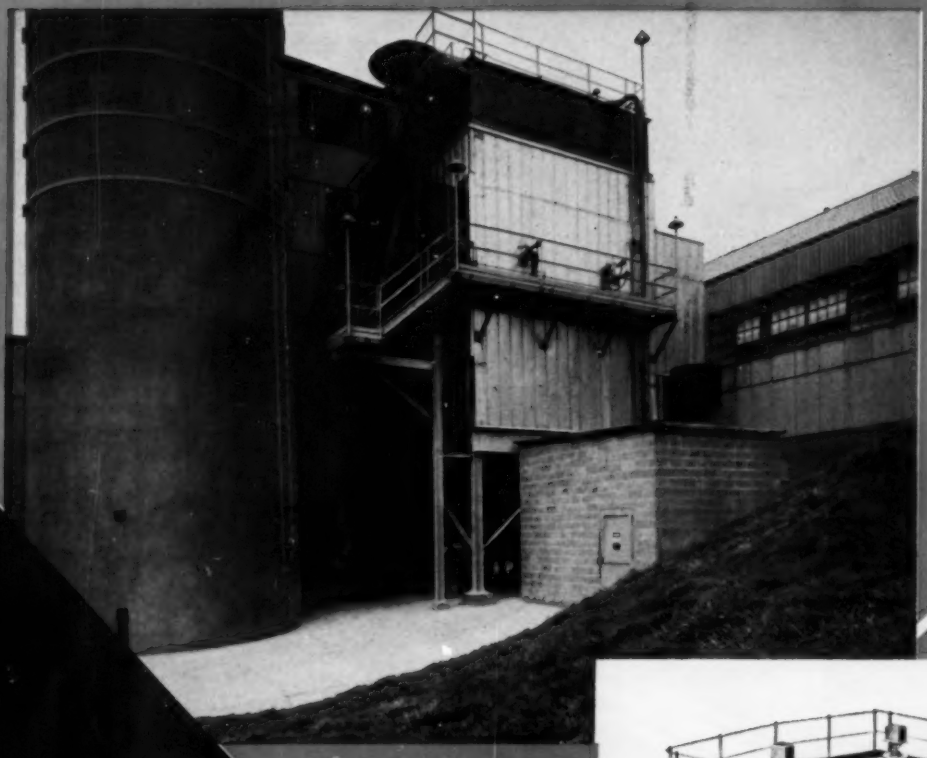
Rapping puffs were eliminated in this installation with Research-Cottrell's electronically controlled M. I. Rappers. This method of continuous, sequential rapping avoids dust re-entrainment in the gas stream and assures optimum precipitator performance at all times.

Research-Cottrell Precipitator at Missouri Portland

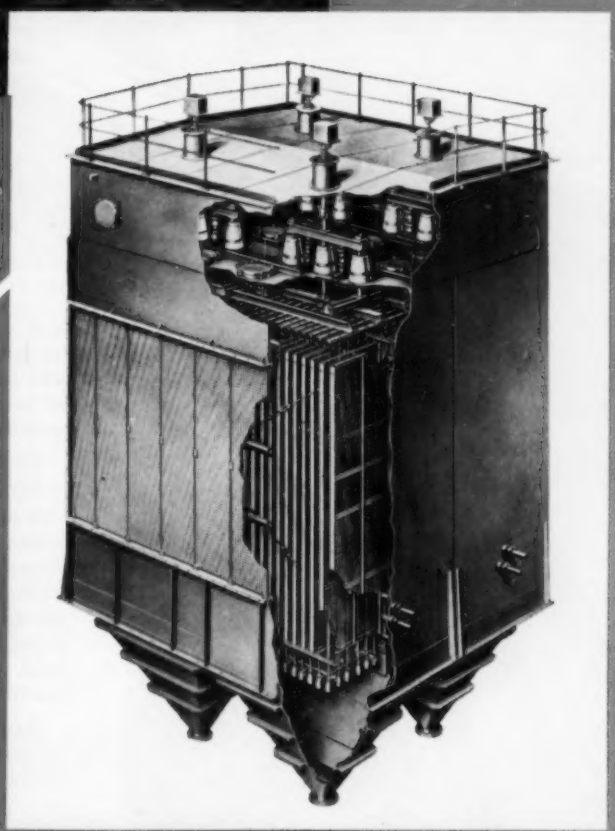
In addition to this installation, Missouri Portland has ordered three more Research-Cottrell precipitators. One, installed early this year, cleans the gases from Prospect Hill's 12′ x 450′ wet process kiln.

Two other units have been ordered for two dry process kilns at the Sugar Creek Plant, Kansas City, Mo. M. I. Rappers will be included on all these installations.

For a detailed description of Research-Cottrell precipitators and their applications in the cement industry, write for Bulletin GB.



At Left:
Shows Research-Cottrell precipitator, connecting flues and stack. Cement block building in foreground at right is substation which contains two half-wave rectifier sets and M. I. Rapper control equipment.



At Right:
Cutaway drawing of the Research-Cottrell expanded metal plate precipitator installed at Prospect Hill Plant of Missouri Portland Cement Co.

Research-Cottrell, Inc.

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Typical of today's modern highway construction is this view of the new Freeway in Oakland, Calif., showing 3 levels of highway structure over 2 levels of railroad. *(Photo courtesy California Division of Highways)*

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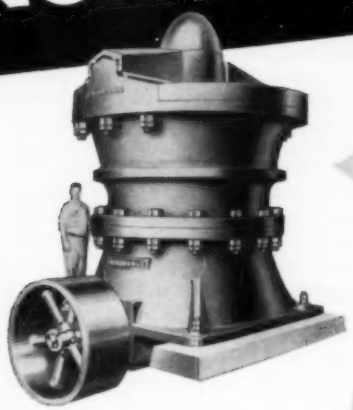

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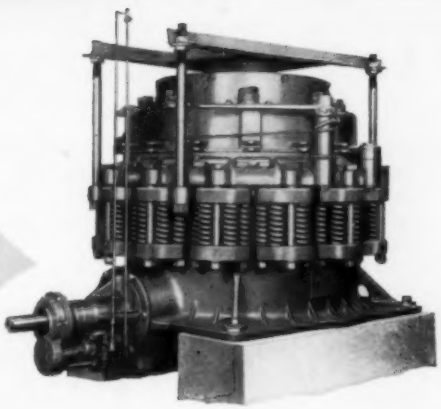

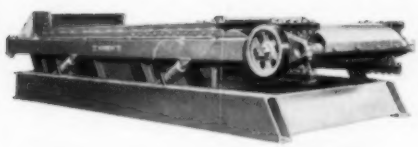

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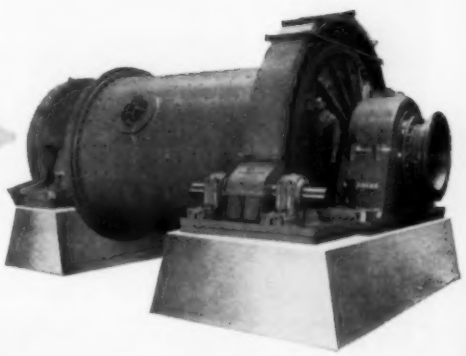

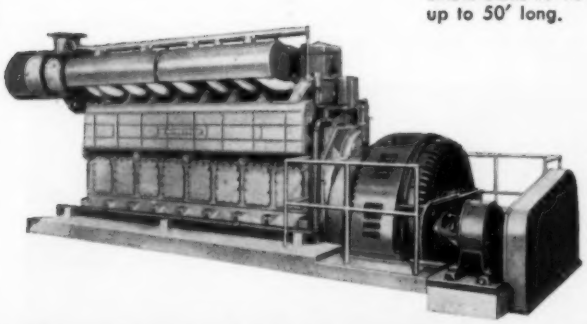

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Inland's New Edmonton Plant— Most Northerly on This Continent

original 900,000-bbl. 1-kiln plant already being doubled in capacity

By PETER S. PETERSEN
Plant Engineer
Inland Cement Company Ltd.

THE accelerated demand for cement in the postwar period induced Sogemines Limited of Montreal to build a portland cement manufacturing plant in Edmonton, Alta., Canada. This location was chosen because it is the fastest-growing industrial and gas- and oil-producing section of western Canada, and at the same time the gateway to the rapidly developing north country. As a result of this decision, Inland Cement Company Limited was incorporated as a company on July 15, 1954.

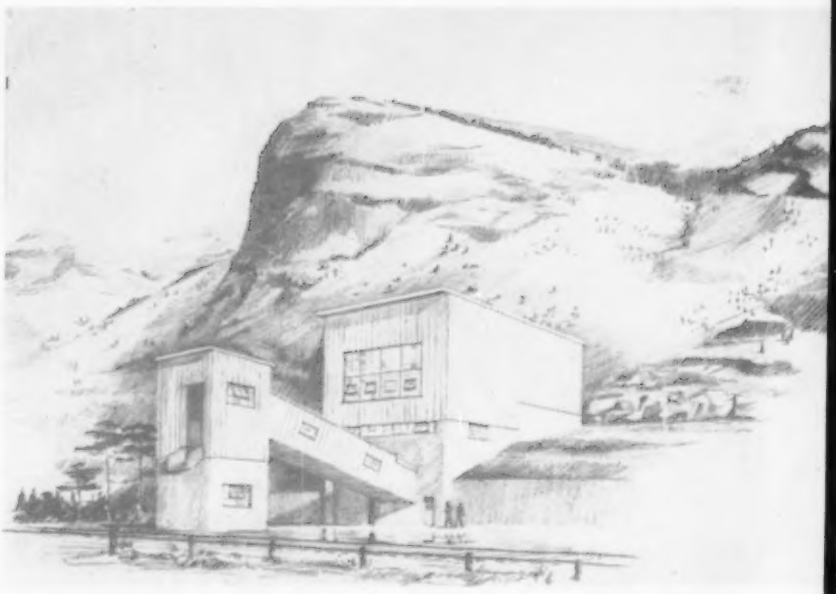
Sogemines Limited, with head offices in Montreal, was formed to participate in financing industrial and mining projects in Canada and is backed financially by a group of Belgian industries headed by Societe Generale de Belgique. In the specific field of cement manufacturing, Societe Generale de Belgique's interests are spread over a number of Belgian and Dutch cement plants. Cimenteries & Briqueteries Reunies, S.A., Brussels, Belgium, is one of its major cement manufacturing projects.

The plant site, covering approximately 230 acres, is located northwest of Edmonton approximately 14½ miles beyond the present city limits, on the Canadian National Railway's main line to the west. The major factors involved in choosing

Left to right: Frank Day, secretary-treasurer; V. Chaly, chief chemist; Fred Ernst, production superintendent; A. P. Robinson, plant manager; George Ross, sales manager; A. Wilson, assistant production superintendent; Roger Jeanty, vice-president and general manager; and P. S. Petersen, plant engineer.

An aerial view of Inland Cement Company Limited's new cement plant at Edmonton, Alta. The clay pit can be seen in the background. In the center is the excavation for six more silos scheduled to be finished by fall.

Artist's sketch of the crusher building and loading station at the limestone quarry at Cadomin, Alta.



this particular location are the fact that the C.N.R. transportation facilities are adjacent to the company's property, that substantial clay deposits are present, and that the proximity of the plant to the city of Edmonton makes available various utilities such as water, sewer, gas, etc. Since a market for cement is within a very short hauling range, this was a very important factor in the decision to erect the plant at this strategic location.

Construction Cimenteries & Briqueteries Reunies, which has had considerable experience in cement plant design, was appointed consulting engineer for the design and construction of the company's project. Foundation of Canada Engineering Corporation did the detailed engineering and assisted with the supervision of construction. Plans were sufficiently far advanced for construction to start in the latter part of April, 1955. Less than a year later, on April 5, 1956, the plant was producing and shipping its first cement in spite of a long severe winter. This exceptionally rapid construction progress was accomplished by close co-operation between the engineers and the general contractor, Burns & Dutton of Edmonton and their sub-contractors.

Structural steel was supplied by Standard Iron of Edmonton. To enable cement manufacturing to be carried on throughout the year, all production equipment was completely enclosed to facilitate heating requirements during the winter months. Reinforced concrete, structural steel, and corrugated asbestos cement were the major building materials used.

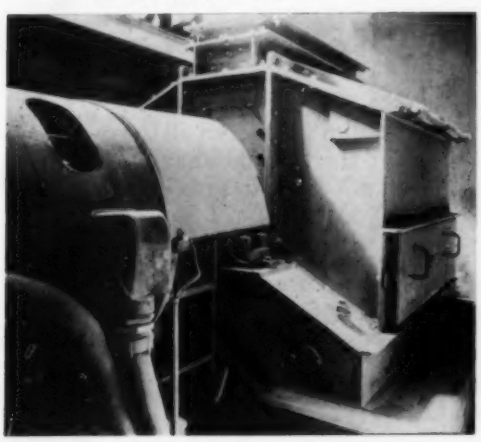
Built at a cost of approximately $8,500,000, the plant employs the wet manufacturing process and now has a production capacity of 900,000 bbl. per year. This capacity will be doubled by the end of 1956 with the installation of additional equipment. When completed, the total capital investment will be $12,500,000.

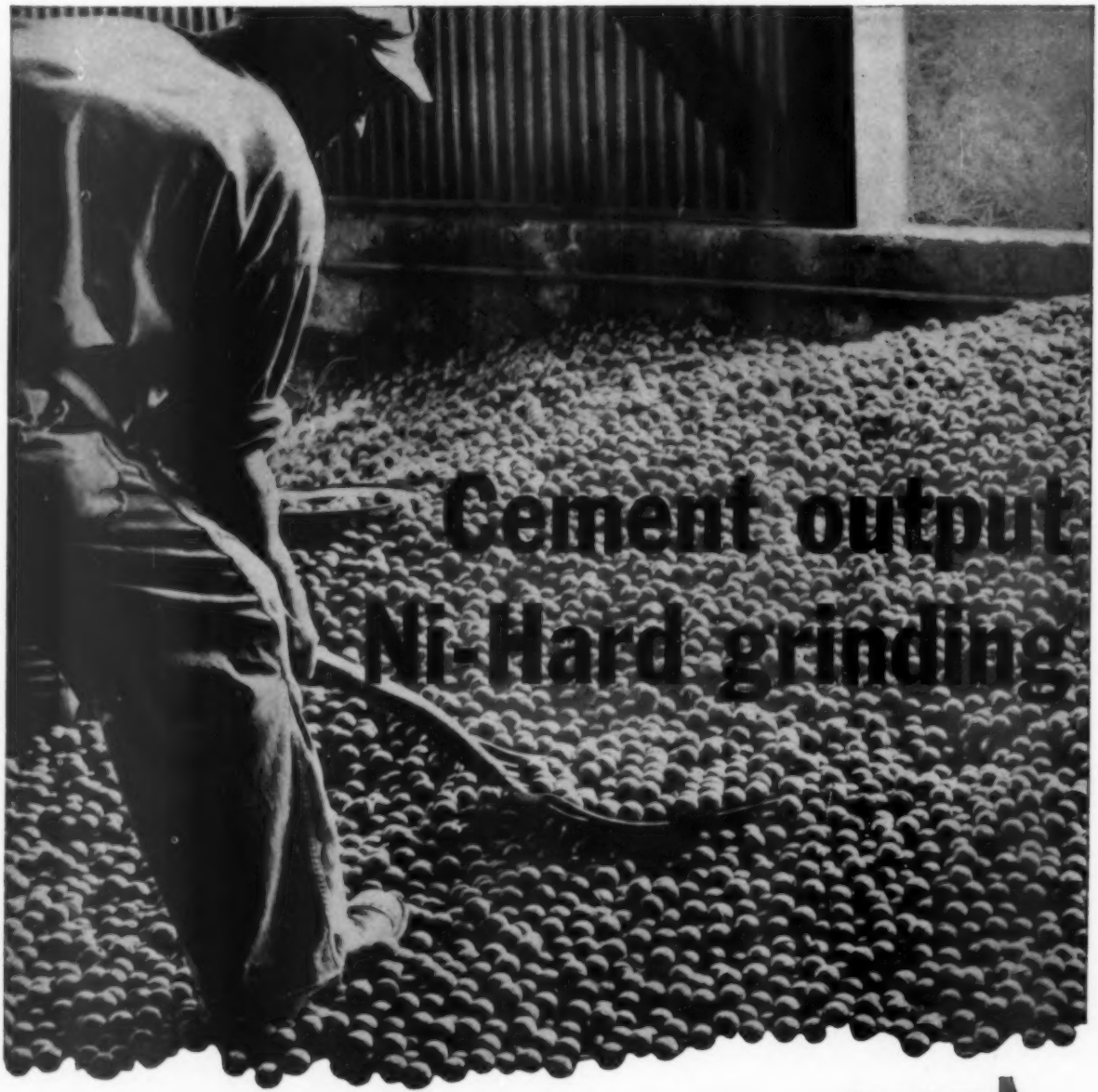
The 11-ft. by 340-ft. kiln viewed from the burner floor. In the foreground to the left can be seen the rather compact natural gas burner. A part of the radiomatic temperature recording unit is mounted just below the burner.

Raw Materials The calcium, alumina, silica and iron required for cement production are obtained from limestone, clay, sand, and leach tailings. Large deposits of suitable limestone were found in the foothills of the Canadian Rockies close to Cadomin, about 180 miles southwest of Edmonton. The average chemical composition of quarried limestone is as follows:

Ignition loss	41.7	percent
CaO	53.0	"
MgO	2.7	"
SiO_2	1.8	"
Al_2O_3	.3	"
Fe_2O_3	.5	"

A general view of the reversible hammermill direct-coupled to a 350-hp., 900 r.p.m., 4160-volt motor. Capacity is approximately 200 t.p.h. from 8 in. to ¾ in.





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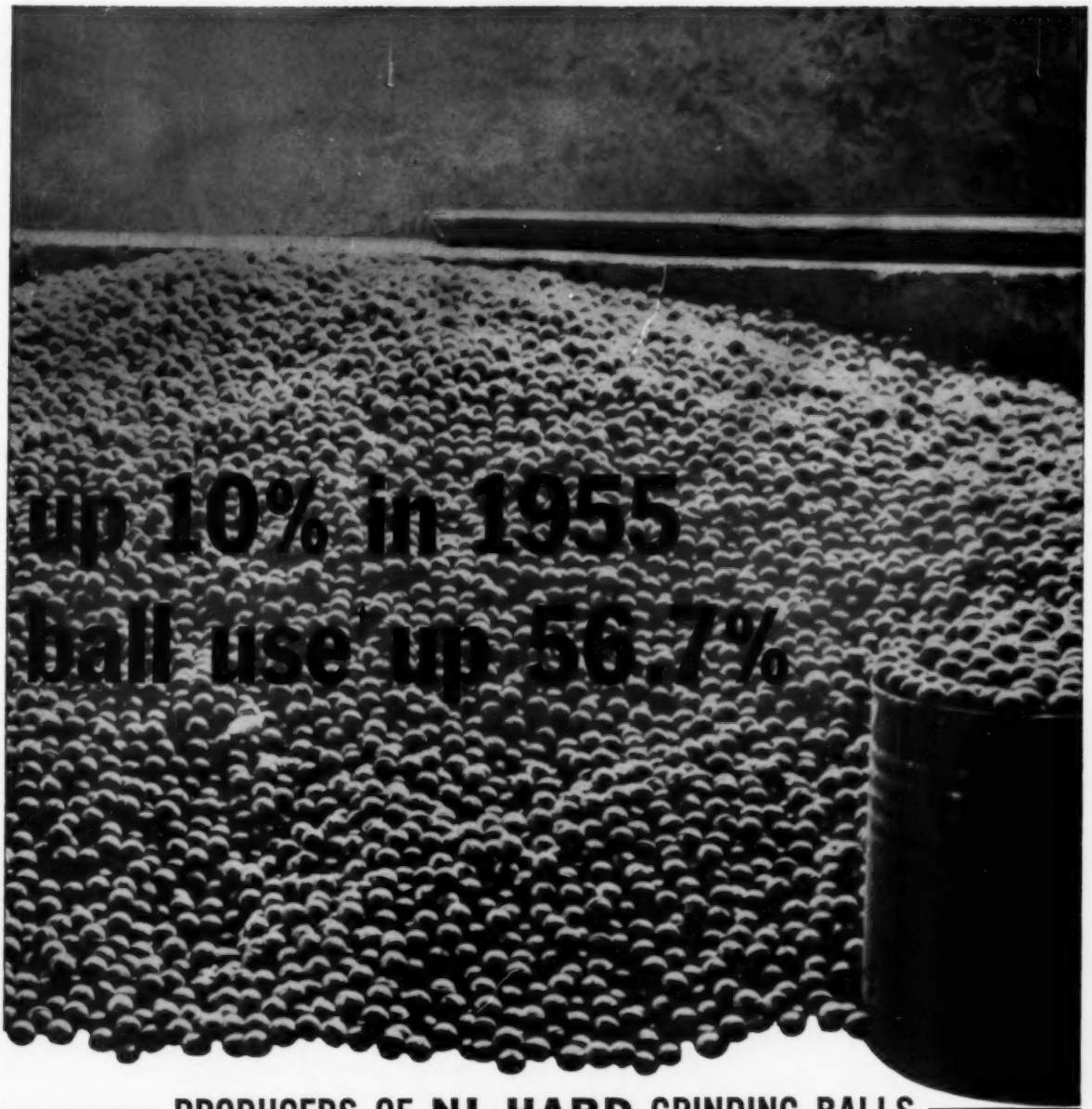

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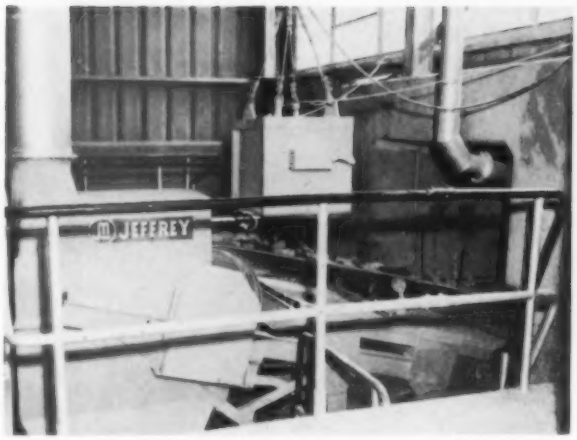
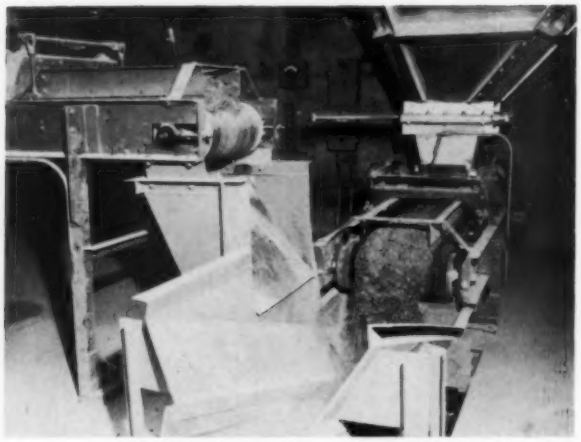


Limestone being fed to a hammermill chute. Dust-free operation is accomplished by exhausting approximately 6,000 c.f.m. from the hammermill through a bag filter.



Two 24-in. feeders discharging limestone and sand onto a belt supplying one of the raw-mills.

The clay, which is obtained within the plant property, has the following chemical composition:

Ignition loss	7.0	percent
CaO	3.0	"
MgO	1.8	"
SiO_2	68.0	"
Al_2O_3	16.8	"
Fe_2O_3	3.4	"

Since the silica supplied by the limestone and clay falls a little short of the requirements, a small quantity of pure silica sand, obtained from a nearby sand pit in truck loads, is added. The leach tailings, containing approximately 70 percent of Fe_2O_2, is purchased in truck loads from Sherritt Gordon Mines Ltd., in Fort Saskatchewan, 20 miles northeast of Edmonton. The tailings are produced by the leaching of nickel ore.

The relative quantities of raw materials used to produce slurry for standard clinker are approximately 68 percent of limestone, 27 percent of clay, 3 percent of sand, and 2 percent of leach tailings. Gypsum, which is received in railroad hopper cars, is added to the clinker before the mixture enters the finishing mills, and represents about 3½ percent of the feed.

Quarry Limestone for the company's production is obtained from a large deposit located about 2 miles south of the town of Cadomin, Alta. The mountain constituting the deposit consists of a stratigraphical thickness of approximately 550 ft. of Upper Devonian limestone beds. These beds form the first major up-thrust at the eastern edge of the Rocky Mountains.

A branch of the Canadian National Railway skirts the western edge of the deposit, so that haulage for loading into the rail cars is limited to that required in the quarry.

The limestone beds strike 100 degrees and dip 33 degrees south. Within a distance of 1,200 ft. from the railroad the mountain rises to a height of over 1,000 feet. The quarry floor is at an elevation of approximately 5,100 ft. above sea level. The opening of the quarry has been carried out with one Ingersoll-Rand wagon drill and three Copco jackhammers supplied with air from an Ingersoll-Rand Gyro-Flo Model Dr-600 diesel compressor. The preliminary objective has been to open up sufficient working space in front of the crusher so that large quarrying equipment will ultimately have sufficient working space. To date, techniques have not been standardized since the opening phases of the quarry require considerable flexibility, and also since considerable care must be taken in blasting due to the proximity of quarry buildings. All blasting is electrically controlled, using standard millisecond-delay detonators.

A large supply of broken rock exists on the mountain slope in the form of talus. The quantity of this material cannot be accurately determined since its depth is not known. Sufficient information is available, however, to indicate that several years' production requirements can be obtained from this source, and it will probably be held as a reserve supply in the event that the crusher is required to be shut down.

In the early stages of the quarry development, rock has been fed to the crusher solely by one Caterpillar D8 bulldozer, which has proved most satisfactory. For the time being, it is pushing rock efficiently for distances up to 200 ft. from the crusher. This unit will be supplanted by other equipment in the future.

The bulldozer pushes the rock directly into an Allis-Chalmers 42-65 gyratory crusher with Hydroset mechanism. This crusher, driven by a 250-hp., 720 r.p.m. motor, has a capacity of 1,200 tons per hour at a setting of minus 8 in. The limestone is then discharged onto a 48-in. by 111-ft. inclined belt conveyor, from which it is loaded directly into 70-ton railroad hopper cars. The crusher and mechanical shop are covered by a 35-ton Dominion Bridge electric overhead crane.

Necessary power for the quarry is being generated by a 350 kw. 550 v. Brush Aboe diesel generator. All production machinery is connected to the 550-v. system, whereas the maintenance and heating equipment, as well as the lighting circuits, may be connected either to a 45-kv.-a. transformer fed from the 550-v. system or to a 20-kw 208-v. diesel generator.

Clay Pit Clay is obtained from the company's own pit, located adjacent to the plant. The deposit is estimated to be sufficient for some 50 years' production and lies beneath a very shallow overburden. During the summer months dry clay is excavated but during the winter it will be excavated under water due chiefly to the extreme depth of frost experienced.

Excavating is done to a depth of 25 ft. by means of a 32B Bucyrus-Erie dragline with a 60-ft. boom and a 1½-cu. yd. Page bucket. It is then hauled a short distance to the stor-

age hall by two 10-ton Mack dump trucks with bodies heated by the exhaust from the diesel engines. This heat prevents the wet clay from freezing and adhering to the bodies in the winter.

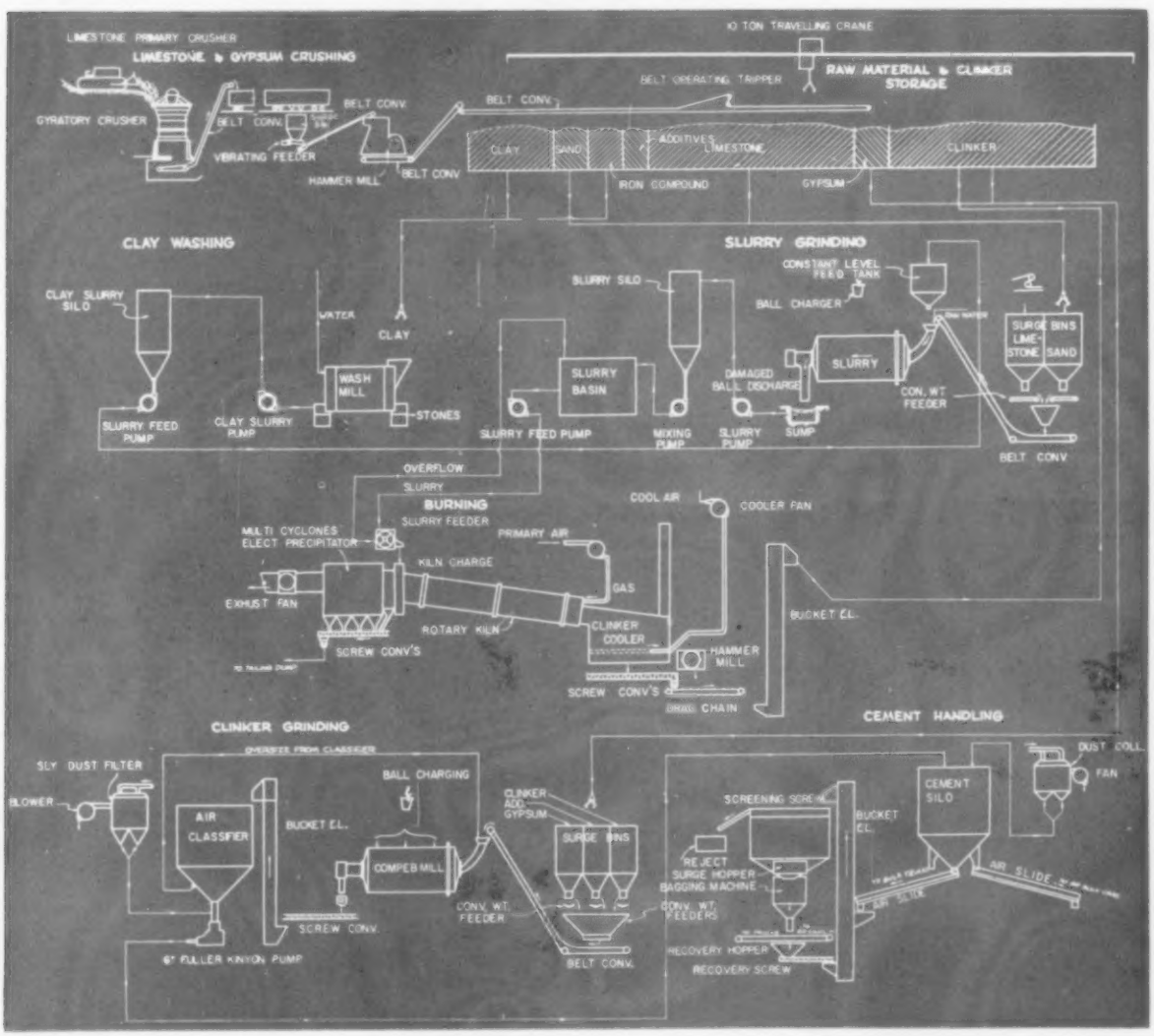
The amount of clay required for the anuual 900,000 bbl. production per year is approximately 250 t.p.d. The crater being formed by the clay extraction process will later serve as a reservoir for process and cooling water. Clay extraction and hauling equipment presently in use will be adequate to keep the plant supplied with clay even after production capacity has been doubled.

Secondary Crushing Limestone, minus 8 in. in size, is transported from the quarry by rail in 70-ton carloads and is dumped into a track hopper having a capacity of approximately one car load. It is then fed onto a 30-in. by 80 ft. inclined belt conveyor by means of a Jeffrey vibrating feeder 30 in. by 66 in. This conveyor passes under a Ding's "Electro-Magnet" to extract any tramp iron which may be present in the raw material. The limestone is then discharged into a Pennsylvania C-102-42 reversible hammermill, which is driven by a 350-hp., 900 r.p.m., 4,160 v., 3-phase, 60-cycle wound-rotor motor.

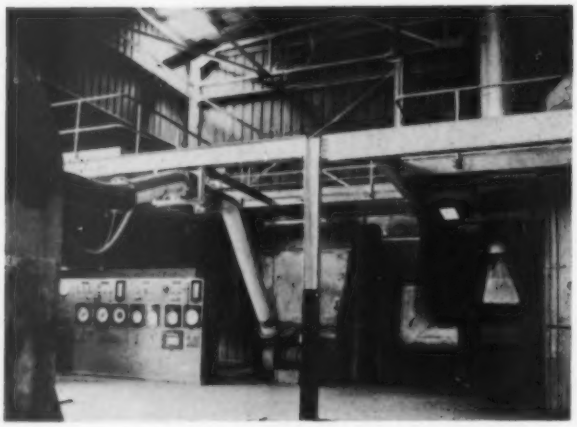
In the hammermill the limestone is reduced from minus 8 in. to minus ¾ in. at the rate of approximately 200 t.p.h. and discharged to another 30-in. by 236-ft. inclined belt conveyor. The anticipated dust problem resulting from this operation was eliminated by means of a 7,000 c.f.m., 9A Sly Dynaclone dust filter. The dust collected is continually loaded back onto the belt conveying the crushed limestone. The 30 in. by 236-ft. inclined belt conveyor (in a completely enclosed gallery) conveys and elevates the raw material to a 30-in. by 251-ft. horizontal belt conveyor having a mobile tripper and mounted in the gallery which runs along the storage hall. This tripper discharges the minus ¾-in. limestone into the storage hall or directly into the limestone feed bins which supply the slurry mills.

The secondary crushing procedure is also used for receiving, crushing, and distributing gypsum. However, unlike the limestone, gypsum is reloaded onto the horizontal belt by the tripper and discharged at the end of the conveyor into the gypsum storage compartments.

Storage The 570-ft. by 103-ft. storage hall is completely enclosed and stores raw materials and clinker. It is divided into compartments with capacities as follows:



Flowsheet of the plant showing the various processes from the quarry to the packhouse.



A section of the burner floor, showing the control panel (not completed), the primary air fan, the dust collector and exhaust fan for excess air from the cooler, and the clinker elevator.

The dust-collecting system for treatment of kiln exhaust gases consists of eight cyclones in series with a two-compartment, 60 kv. elec. trostatic precipitator. Overall efficiency of the collector is 98 percent.

Limestone	40,000 tons
Clinker	40,000 tons
Clay	10,000 tons
Ferrous compound	2,000 tons
Additives	2,000 tons
Sand	4,000 tons

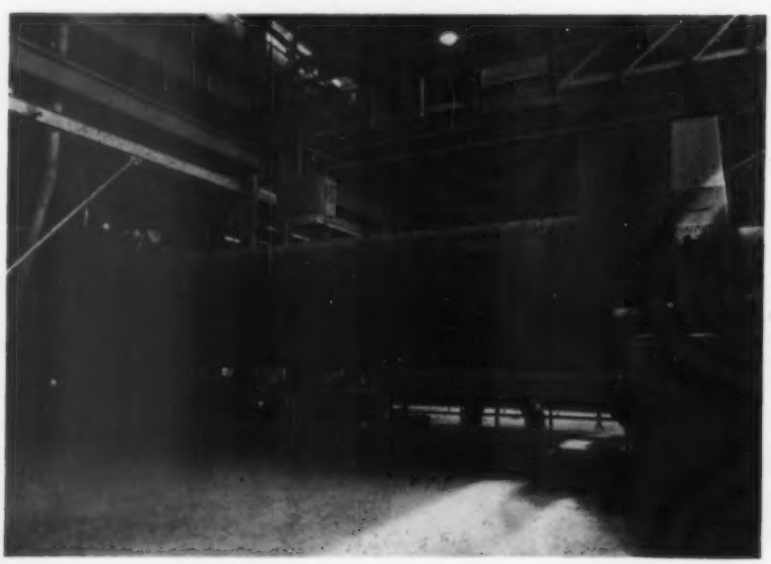
Gypsum is stored in a 1,700-ton capacity compartment built on top of the tunnel crossing the storage hall and connecting the kiln building and the mill building. Clay, sand, and ferrous compound are delivered to storage by dump trucks, which empty the material into a hopper located at the west end of the storage hall.

Raw materials and clinker within the storage hall are transported by a 14-ton by 100-ft. span Dominion Bridge overhead crane fitted with a 3½-cu. yd. Blaw-Knox clamshell. The hoisting and closing motors are air-cooled by recirculated air passing through hollow members of the trolley structure. The bridge travel motor is cooled in a similar manner by air passing through one of the main girders.

Along the south side of the storage hall are the feed hopper for the wash mill; the limestone and sand bins, one of each for the two raw mills; and two gypsum bins, two additive bins, and two clinker bins, one each feeding the two cement mills.

The entire building is heated by excess heat from the kiln building during the winter months, to prevent raw materials from freezing.

A general view of the cement mill area. The 10-ton service crane, which can be operated from the cab or from the floor, also covers the raw mill area.



Slurry Preparation

From the bins limestone and sand are fed onto a 24-in. by 34-ft. conveyor belt by means of two 24 in. by 6-ft. 5-in. Merrick Feedoweights. It is then discharged into a two-compartment, 8- by 37-ft. Canadian Allis-Chalmers raw mill, where water is added to give the slurry a 32 percent moisture content.

Each mill is driven by a 900-hp., 180-r.p.m., 4160-v., synchronous motor through a Cutler Hammer magnetic clutch (Type D.L. Size 60 by 43). The capacity of each mill, working in open circuit, is approximately 30 t.p.h. of dry material, the mills rotating at 18.7 r.p.m.

The ball charge is approximately 115 tons of 3- to 1-in. diameter balls. The first compartment has a ball charge of approximately 15 tons of 3-in. diameter and 15 tons of 2½-in. diameter. The second compartment charge is 25 tons each of 2-in., 1½-in., and 1¼-in. balls and 10 tons of 1-in. balls.

A 10-ton, 35-ft. 6-in. span Dominion Bridge overhead crane covers both the raw and cement mills and can be controlled either from the floor or from the crane cab, and is used for charging balls and servicing the mills.

Motors, clutches, control desk, and switch gear are located in an adjacent room partitioned off with glass walls and kept clear of dust by pressurized, filtered air. The main gear and pinion are lubricated by an automatic Farval lubricating system. Controlled by a timer, it applies grease at intervals of approximately every 6 minutes.

From the mills, slurry is discharged into a sump, to be pumped with a 4-in. Wilfley Model C, slurry pump

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(Signed) JOHN L. KELLEY, Owner
Roscoe, Illinois

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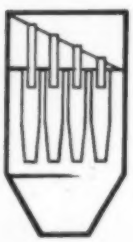
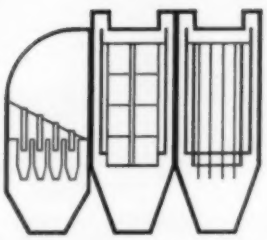
• Almost a half-century ago—in 1907 to be exact—Western Precipitation installed the first commercial application of the now-famous Cottrell Electrical Precipitator—and has more know-how, more varied experience and application background in world-wide installations in this type of equipment than any other organization, domestic or foreign.



• Many years ago Western Precipitation was first again with the multiple small-diameter tube type of cyclonic collector—the type with higher centrifugal forces for greater recovery efficiencies. And through the years, Western Precipitation engineers have continuously led in new advancements, new refinements in the *mechanical* recovery field as well as in *electrical* recovery methods.



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to the slurry blending tanks through a 6-in. underground pipe. This pump is sufficient to handle slurry from the two mills simultaneously. A duplicate pump system serves as a stand-by.

Clay and ferrous compound slurry is prepared with a 50 percent water content in a 26-ft. Allis-Chalmers wash mill driven by a 100-hp., 900 r.p.m. motor at the rate of 30 t.p.h. of dry material. Cooling water from the rotary compressors is used as process water and applied in the feed hopper for washing out purposes. The slurry produced by the wash mill is sent direct to the blending tanks by either one of two 4-in. Wilfley Model C slurry pumps. A third pump is available for pumping slurry to a constant-level feed tank above each raw mill, should grinding be required.

The slurry blending tanks are built of reinforced concrete with conical steel bottoms and are arranged in a group consisting of four 17-ft. diameter tanks and four 24-ft. diameter tanks with capacities of 10,900 cu. ft. and 20,650 cu. ft., respectively.

Final blending of slurry is accomplished in these tanks by means of one of two 8-in. Wilfley Model C pumps. Slurry in the tanks is agitated continually with 60-p.s.i.g. air supplied by one of two 400-hp., 2-stage Fuller rotary compressors, each having a capacity of 2,500 c.f.m. Air is supplied to the smaller tanks by means of a 2-in. pipe and a 3-in. pipe in the larger tanks. The pipes are suspended from the top, placed through the center of the tanks; they discharge air 2 ft. above the outlet of the conical bottoms. Total consumption of air for agitation purposes is approximately 1,600 c.f.m. Although this system consumes more power than the mechanical agitators, it was felt that the saving in maintenance costs would more than offset the extra power cost.

All eight blending tanks are interconnected with a piping system which allows the above mentioned 8-in. Wilfley pumps to withdraw slurry from any one of the tanks and discharge it to any one of the remaining seven tanks. The same pumps are used to transfer the finished slurry from the blending tanks to the slurry storage tank located at the feed end of the kiln. In an emergency they can also be used for feeding finished slurry directly to the kiln.

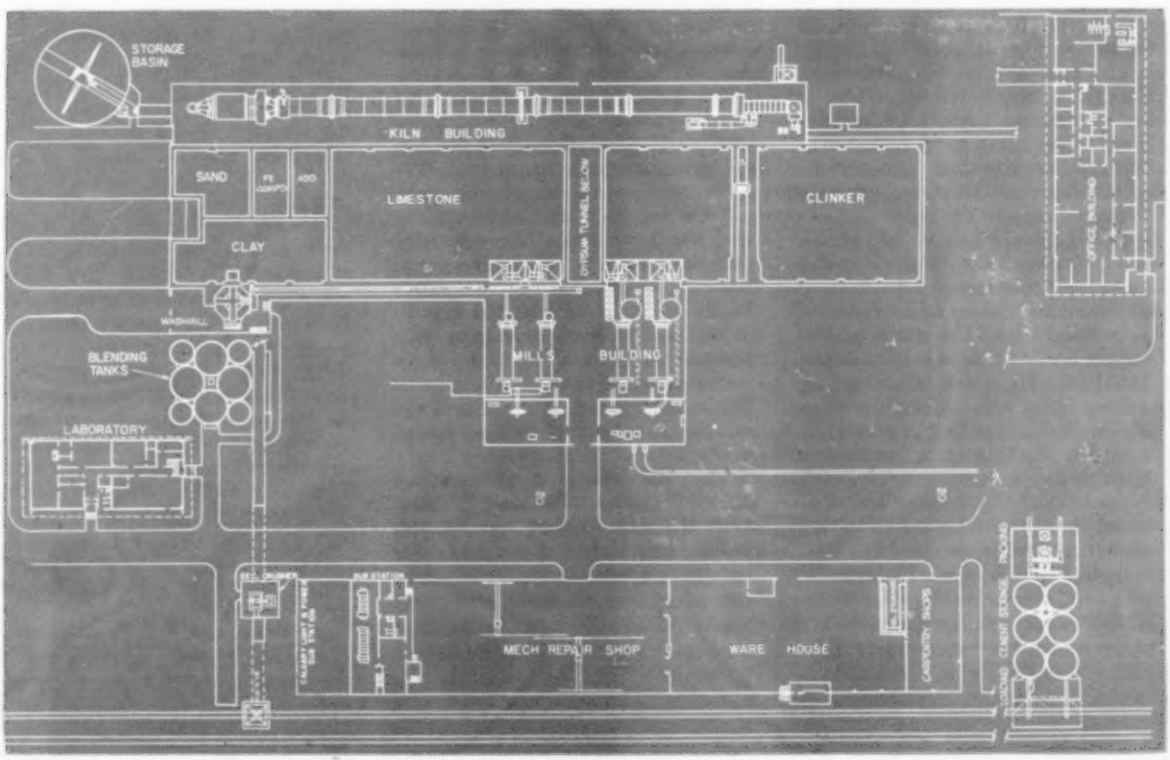
The slurry storage tank, which is 70 ft. in diameter, has a capacity of 70,000 cu. ft. and is built of reinforced concrete; it is partly underground and has a gunite domed roof. A unique feature of this tank is that the natural clay deposit beneath the tank forms its floor. The slurry storage tank is equipped with a combined pneumatic and mechanical Dorr-Oliver agitator driven by a 15-hp. motor at approximately one r.p.m. The air feeding the agitator is supplied by the Fuller compressors mentioned previously.

Clinker Burning Slurry is drawn from the storage tank by one of two 4-in. Wilfley Model C pumps located in an adjacent pump pit, which feeds the ferris wheel-type slurry feeder for the kiln. Excess slurry from the feeder is returned to the storage tank by gravity. The two 4-in. Wilfley pumps are sufficient to supply slurry for an additional kiln.

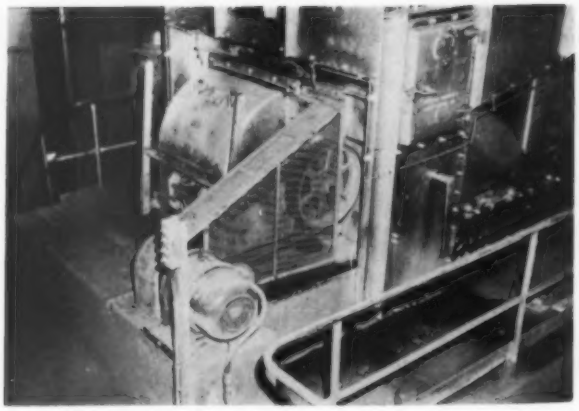
The ferris wheel feeds the slurry to a 340-ft. by 11-ft. diameter, straight Allis-Chalmers rotary kiln, which is supported by five tires.

The kiln refractory, supplied by A. P. Greene Fire Brick Co. Ltd., is 6 in. in thickness throughout the length of the kiln, and installed as follows, commencing at the burner end: 2 ft. "Green Hot Zone" (40 percent alumina); 82 ft., "Kruzite" (70 percent alumina); 97 ft., "Green Hot Zone" (40 percent alumina); 97 ft., "Green Empire" (32-40 percent alumina); and 54 ft. (chain sec.), Abrasion resistant "Red Brick". The remaining 8 ft. is unlined.

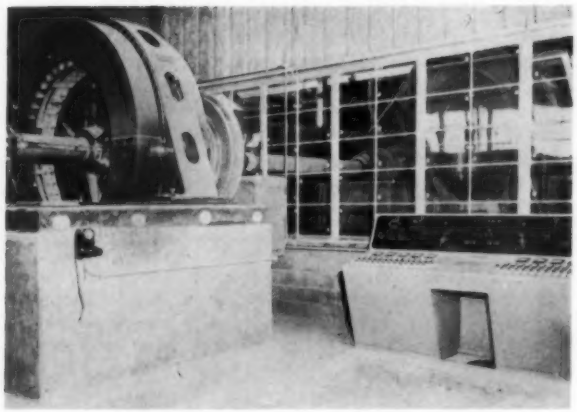
Approximately 10,000 ft. of ¾-in.



A general plan view of the New Inland plant at Edmonton.



The 6- by 33-ft. clinker cooler with its clinker breaker and grizzly. The ¾-in. spacing of the grizzly eliminates the necessity of a separate clinker crusher.



The cement-grinding control panel and one of the 900-hp., 180 r.p.m. synchronous motors. The motor and the control room are cooled and pressurized by filtered air.

chain is used to make up the chain section in the kiln. It is made of round links in order to distribute wear and lengthen chain.

The kiln is driven by a 125-hp., 400/1200 r.p.m. constant torque d.-c. motor through a V-belt drive and a Falk speed-reducer. The kiln motor also drives a 12.5-kv.a. A.-C. generator supplying power to the slurry feeder motor and thus synchronizing the feeder speed with the kiln speed. The motor generator set ,transformer, and switch gear for the kiln drive are all located inside the drive pier. The 125-hp. kiln drive motor, as well as the drive pier, is ventilated by forced, filtered air.

The kiln is fired by natural gas through a Shellenberger, Gregg & Co. gas burner capable of burning 2,500 c.f.m. of gas at 22 p.s.i.g. The primary air supplied through the burner from a 15-hp. fan amounts to approximately 5 percent.

The kiln discharges the clinker into a 6-ft. by 33-ft. "Fuller" clinker cooler at this point where it is quenched and cooled by air delivered by a 60-hp. fan. The major part of the air is drawn into the kiln in preheated condition and serves as secondary air for combustion; the excess air above the cooler grate is automatically discharged to atmosphere through a type "LR" Buell dust collector by a 25-hp. exhaust fan. Collected dust is fed by gravity to the clinker conveying system.

By installing a grizzly bar assembly with ¾-in. spacing for the Fuller clinker breaker at the discharge end of the cooler, the common and rather costly installation of screens and clinker crusher was completely eliminated.

The minus ¾-in. clinker is conveyed to the storage hall by one of two conveying systems each consisting of a 40-t.p.h. dragchain and a 50-t.p.h. bucket elevator. In the event that the clinker storage compartment in the storage hall should prove insufficient for winter storage, one of the dragchains is reversible, so that excess clinker can be conveyed to outside storage *via* bucket elevator and pivoted belt conveyor.

A size 440⅔ D.W.D.I. Canadian Sirocco fan driven by a 150-hp., 900-r.p.m. motor draws the kiln gases through a set of Buell multiple cyclones installed in series with a two-compartment 60-kv. Buell electrostatic dust precipitator and discharges the clean gases to the atmosphere through a 6-ft. diameter by 100-ft. stack made of 5/16-in. thick steel plate. The efficiency of the dust collecting system is 98 percent. The collected dust from the multicyclones will be fed back to the kiln along with the slurry, while the precipitator dust will be sold as fertilizer. At normal kiln load, approximately 90,000 c.f.m. of gases at 550 deg. F. is handled by the system at a total pressure drop of 7 in. w.g. (from cooler to exit of stack). The exhaust fan runs at constant speed and the exhaust is controlled by inlet dampers.

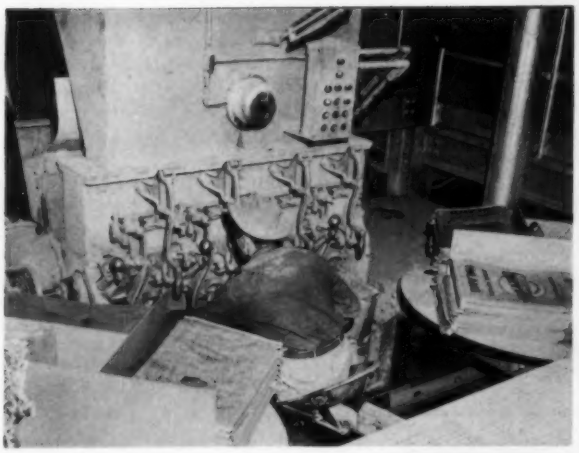
The kiln operation is controlled from a master kiln control panel built in five sections as follows: power, kiln, cooler, slurry and natural gas, and exhaust gases. The control panel, manufactured by Minneapolis Honeywell, contains standard automatic controls for operation and protection, *i.e.*, electronic controls adjusting the cooler bed speed as a function of the temperature and the vent stack damper position depending on the pressure above the cooler grate, electronic recorders for kiln speed, gas pressure, gas temperature and gas flow and kiln temperatures. It also has a Bailey oxygen and combustible analyzer and recorder. The control panel cubicle is kept dust-free by pressurized filtered air.

Cement Grinding The plant employs two finish-grinding circuits operating independently or collectively as required.

Clinker and gypsum are fed to separate bins by the 14-ton storage hall bucket crane, and are extracted from bins by 24-in. by 6-ft. 5-in. and 24-in. by 8-ft. Merrick Feedoweights, respectively, conveying the material onto a 24-in. by 34-ft. belt feeder to the cement mill. These mills, which are identical in all respects to the raw mills, have a capacity of approximately 30 t.p.h., with a fineness of 2,700 Blaine.

Cement leaving the mills is conveyed to a bucket elevator by means of two screw conveyors. The bucket elevator delivers the cement to a 16-ft. Sturtevant air separator driven by a 125-hp. motor through a V-belt drive. Cement of correct fineness is then delivered by a screw conveyor to one of two 7-in. Fuller-Kinyon pumps, driven by a direct-connected 100-hp. motor. Each pump is supplied with air by individual 100-hp. single-stage Fuller rotary compressors.

Tailings from the air separator are circulated by gravity to the cement mill. A #20 Type A, Sly Dynaclone filter with a 5 ft. classifier is employed in each grinding circuit for cleaning 16,000 c.f.m. of cooling and dedusting air. Approximately 10,000 c.f.m. is drawn through the Sturtevant air separator, 4,000 c.f.m.



Left: The 4-tube bagging machine in operation. Notice the two 4-compartment swivel tables for empty bags.

Below: The 72- by 12-ft., 125,000-lb. truck scale in operation.

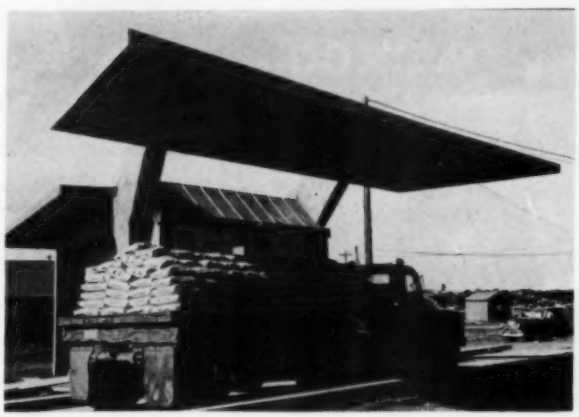
through the mill, and the remaining 2,000 c.f.m. from elevators, screws, and dedusting hoods. The air is exhausted by means of a 25-hp. Canadian Sirocco fan.

A 3-hp. back-blower insures thorough cleaning of the filter bags. Dust collected by the classifier returns to the cement mill, while the dust from the filter section gravitates directly to the Fuller Kinyon pumps. Each of the latter has a capacity corresponding to the total output of both cement mills. Through one of two 6-in. pipes the cement is conveyed approximately 1,000 ft. to the six cement silos. For convenient accessibility, the horizontal portion of the piping system is built on supports, 1 ft. above ground. The vertical portion, for the same reason, is installed in the stairwell between the storage silos.

Motors, clutches, control desk, transformers, and switch gear for the cement mills are located in an adjacent room partitioned off by glass walls and kept dust free by pressurized filtered air.

Storage and Cement Shipment Cement is stored in six 24-ft. diameter silos having a capacity of 1,300 tons each, arranged in two rows of three each at right angles to the railway track. Each silo is equipped with a conical steel bottom having three outlets pneumatically operated by Fuller rotary valaves. Two 14-in., 8-degree sloped Fuller-Huron Airslides, pivoted at the loading end, load railway cars with bulk cement, which is loaded on trucks by gravity, directly beneath the silos, through telescopic loading chutes operated by electrically driven hoists.

Cement for bagging is conveyed to a bucket elevator by one of two 10-in., 8-degree sloped Fuller Huron Airslides. The bucket elevator discharges cement into a 3-ft.-dia. screening screw at the top of the cement storage bin. The level of cement in this bin is automatically controlled by means of two Bindicators operating the Fuller rotary valves. Cement from the storage bin is fed to a bagging machine surge bin by a rotary feeder also controlled by Bindicators.



A 4-tube St. Regis bagging machine with a capacity of 50 t.p.h. discharges the bags onto a 30-in. reversible belt conveyor. At either end of this belt conveyor the bags are flipped over onto a live roller conveyor which delivers them to a retractable 36-in. by 30-ft. shuttle conveyor. Movement of the shuttle conveyors is electrically operated and can be controlled from the trucks by a pushbutton at the discharge end.

Cement spillage from the bagging machine and the two live roller conveyors is returned to the elevator by means of a recovery screw. A type 9A Sly Dynaclone dust filter handles about 7,000 c.f.m., dedusting the bagging machine and affiliated equipment and returning the dust to the cement bin.

Paper bags are stored on three floors above the bagging machine and are fed to the machine floor by spiral chutes. A separate room has been provided for humidifying the bags during the winter months.

By reversing one of the live roller conveyors, bags can be transferred to a 30-in. by 100-ft. belt conveyor and delivered at the railway siding. All bulk loading points are dedusted by a central exhaust fan.

All six silos are kept in a slight vacuum by a 7,000 c.f.m. Sly bag filter. Cement trucks are weighed on a 72-ft. by 12-ft., 4-section, 65-ton Fairbanks-Morse truck scale. All conveyors and elevators were supplied by the Jeffrey Manufacturing Co. Ltd.

Quality Control The laboratory, which is conveniently located next to the slurry blending tanks, is well equipped for physical and chemical analyses of raw materials, slurries, clinker, and finished cement.

Emphasis is placed on chemical analysis of slurry. Raw materials are spot checked only and mixed in approximate proportions. The four slurries produced, each predominant in one of the main oxides of clinker (Al_2O_3, Fe_2O_3, SiO_2 and CaO), are carefully analyzed for each of these oxides, as well as for MgO. They are then blended to produce a constant composition of finished slurry, the analysis of which is checked and corrected if necessary. The feed to the kiln is therefore chemically constant. This also applies to the clinker, which requires only one analysis per day. The clinker being regular, the regularity of cement is obtained by carefully proportioning and checking the gypsum (or SO_3) content and fineness (Blaine). For the foregoing chemical analysis, the classical gravimetric, colorimetric and complexiometric methods are used.

The finished cement is then tested for compressive and tensile strength, autoclave, expansion setting time, and fineness, according to A.S.T.M.

specifications. The laboratory is also equipped to carry out special tests for consistency of cement paste at high temperatures and pressure (oil well cement), alkali content (by the flame photometer), etc.

The high flexibility of the four slurry blending methods, and the excellent control of the finished product facilitates the production of various types of cement according to the needs of the market. The company's potential manufacturing program is to produce normal portland cement, high-early-strength portland cement, oil well cement, sulphate-resistant cement and masonry cement.

Electrical Installations The Edmonton plant is being served from Calgary Power's Calder substation *via* a one-mile long 22-kv. transmission line terminating in one 6,000-kv.-a. outdoor substation which feeds 4,160 v. to the company's metal-clad indoor switchgear. The latter is equipped with drawout-type air breakers, electrically operated from a 120-v. d.-c. battery.

Underground cables in a duct system connect the main switchgear with 1,000-kv.-a. metal-clad indoor unit substations, each consisting of a high-voltage load break switch, an Interteen cooled transformer, and secondary switchgear with manually operated draw-out type air breakers. The stations are spotted strategically throughout the plant, *i.e.*, close to the 550-v. load and at locations having the minimum of dust and heat. Motors up to 200 hp. are of totally-enclosed fan-cooled construction for 550-v. service and are energized from these unit substations, whereas larger motors have been selected for 4160 v.

Utilities Natural gas is supplied by Northwestern Utilities Ltd., Edmonton. It is brought to the plant site through a 6-in. main line carrying a pressure of 150 p.s.i.g. In the gas reducing station, located close to the kiln building, the pressure is reduced to 22 p.s.i.g. for use in the kiln burners. Gas for domestic consumption is further reduced to approximately 10 in. w.g.

Water is supplied by the City of Edmonton through a 10-in. main line to one of two type SJ Allis-Chalmers centrifugal pumps driven by a direct-connected 40-hp. motor. The pumps deliver water to a 125,000-gal. water tower manufactured by Horton Steel and installed on top of the slurry blending tanks. The temperature of the water in the tank is maintained at approximately 40 deg. F. during the winter months by means of a gas-fired water boiler. Water is distributed throughout the plant from the tower. The plant sewage disposal system is connected to the City of Edmonton's sewer line.

Maintenance The warehouse and maintenance shops are located in a 420-ft. by 82-ft. building which is completely covered by two 5-ton Dominion Bridge overhead cranes.

The mechanical maintenance shop is fully equipped with up-to-date machine tools and is capable of handling practically all repairs. Regular plant maintenance is carried out with four mechanics working on a rotating shift basis and the remaining crew on a regular day shift.

Officers and Management Officers of the company are the following: W. Lester Forster, president; Roger Jeanty, vice-president and general manager; and Frank L. Day, secretary-treasurer. George Ross is sales manager; A. P. Robinson is plant manager; P. S. Petersen is plant engineer; Fred Ernst is production superintendent; and Vlod Chaly is chief chemist.

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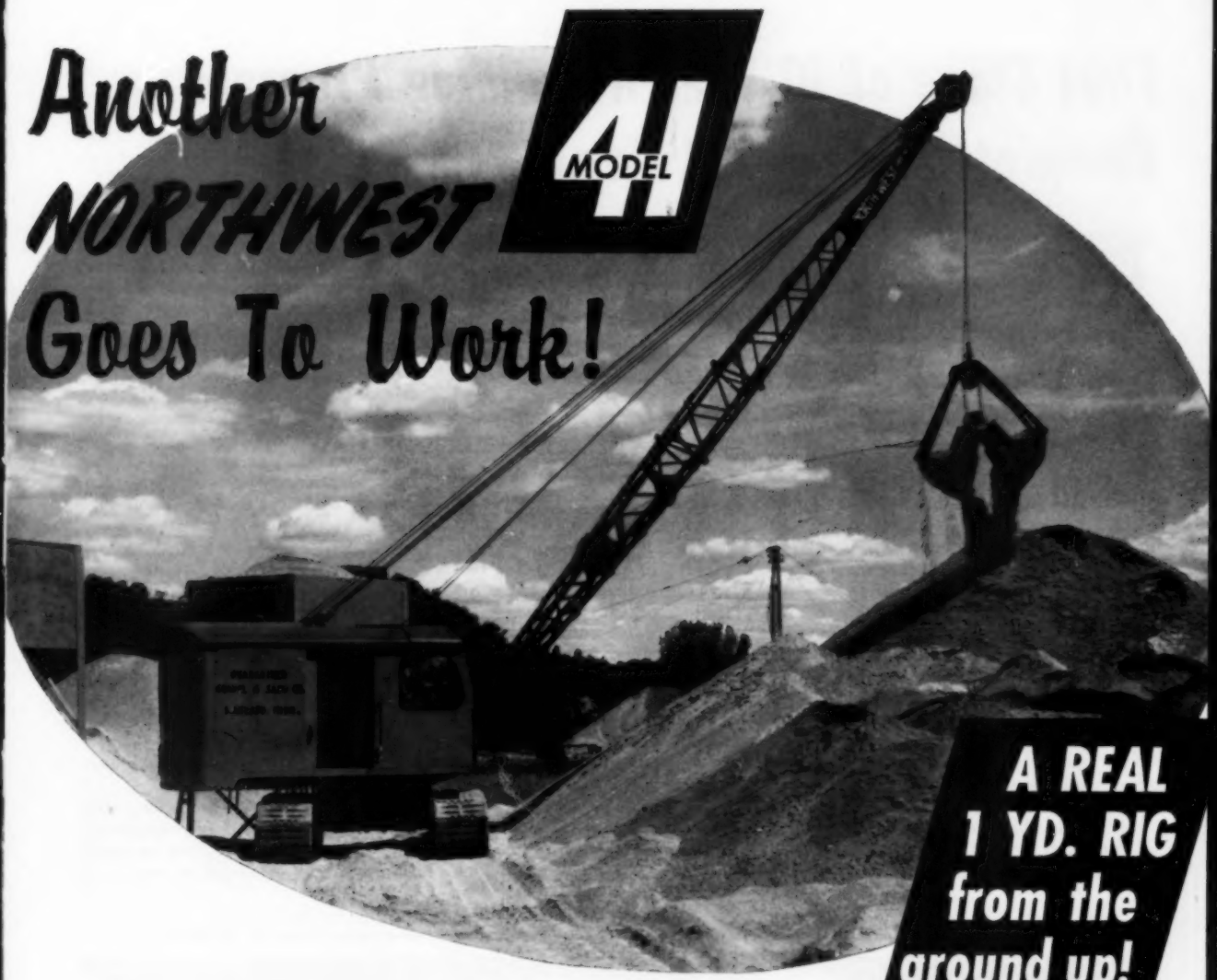

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First Stage of 10-Year Rebuilding Program Completed at Whitehall Cement

Another ON THE SPOT Report

By ROY L. PECK

THE original plant of the Whitehall Cement Manufacturing Company was built in 1899, at Cementon, Pa., a small community seven miles north of Allentown along the Lehigh River. First named the Whitehall Portland Cement Company, the company rebuilt and enlarged the facility in a continuing program starting in 1911, when the name was changed to its present form.

The reconstruction projects now under way at this plant are expected to be finished this year. They are the first, most necessary, and most logical parts of a carefully planned program which on completion will result in practically a new plant. It is felt that because of the nature of the portland cement manufacturing business, a plant is usually substantially rebuilt in 25-year cycles. Since conditions within the company, wartime restrictions, and shortages in certain supplies had not permitted any considerable projects to be built at the plant since 1940, the present program was inaugurated.

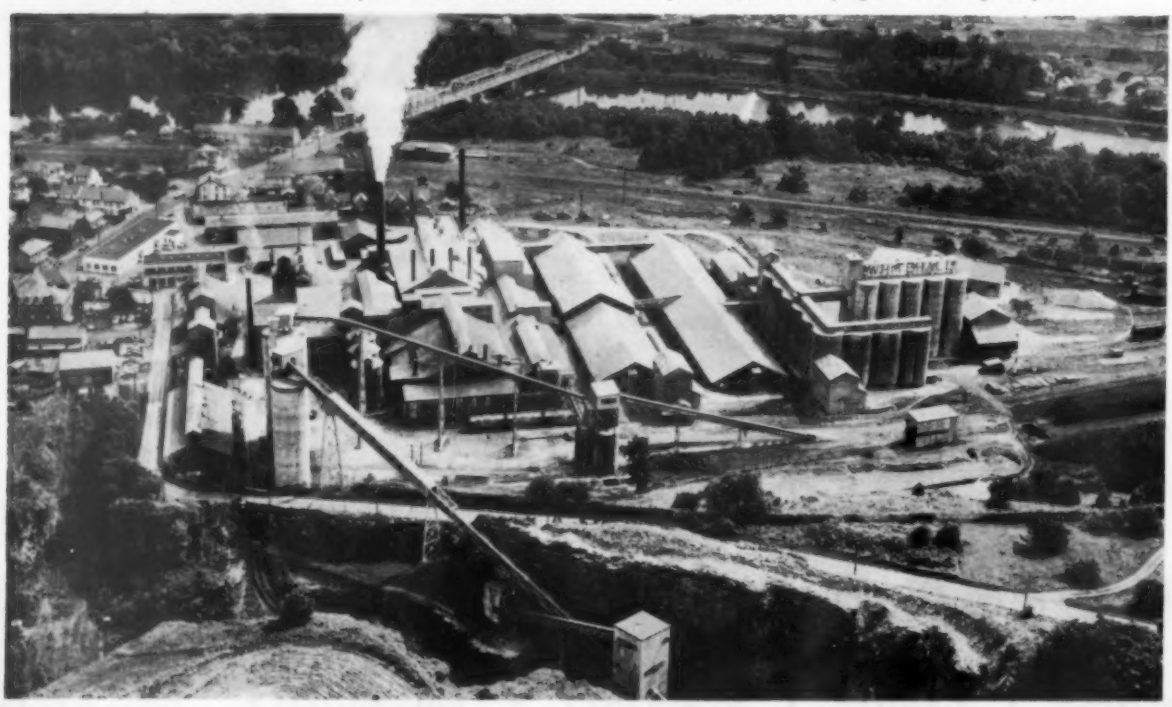
The work of modernization includes an entirely new layout for the handling of raw materials during the first stages of production; installation of appropriate equipment to handle the raw as well as the incoming materials; and the complete rebuilding of the drying, pulverizing, burning and electrical equipment. In addition, new concrete silos for the storage and loading of finished cement will be built this year to replace two old warehouses that date from the first building of the plant.

Originally, stone from the quarry face was taken by small railroad cars drawn by diesel-powered dinky engines, to the foot of an incline. The cars were hauled by cable to the top of the quarry and the stone was dumped into the primary crusher, from which it went through secondary crushers and into storage. From this storage the rock was combined with limestone, sand, and iron ore by a method (now obsolete) which was costly and wasteful of manpower, before continuing in the process stream to a third stage of crushing before going to the dryers.

To replace this system, the primary crusher has been installed on the floor of the quarry, and the cement rock is delivered to it by trucks. After the first-stage crushing, the rock goes by belt conveyors to the secondary crusher and screens, then again by belt conveyor into three new concrete silos. Three additional silos also handle the storage of limestone, iron ore, and sand. The proportioning of the material from these silos is automatic onto belt conveyors as it goes into processing at the dryer plant. The new layout involves the use of two crushers, whereas the old required five crushers to accomplish less work on the materials. Furthermore, the old quarry arrangement required considerable overtime operation, which has now been eliminated.

An unloading station has been built to handle incoming materials, such as coal, limestone, iron ore, sand and gypsum. With the exception of

An aerial view of the Whitehall plant at Cementon, Pa., where a ten-year modernization program is nearing completion.



the coal, which continues to go into the silos previously used for this storage, the remainder of these materials are conveyed into the new silos by conveyor belts.

Unit coal mills have been installed for each of the six kilns, pulverizing and drying the fuel and feeding it automatically into the burning process. This project alone pays handsome dividends in lower cost and better working conditions; it also replaces facilities which go back to the original building of the plant.

The electrical facilities have been completely rebuilt, this project to include a change to higher voltage, and the installation of new switch gear, lines, motors, and a transformer station. This station permits the purchase of some outside power, necessitated by the increased production and the requirements imposed by modern cement specifications. The modern cement plant is a tremendous user of power. Last year, for example, the Whitehall plant generated and used over 30,460,000 kilowatt-hours of electricity, equivalent to the amount used in 11,250 average homes.

When we visited the plant, construction of the new concrete silos for the loading and storage of finished cement had not yet been initiated, but the engineering and studies of this part of the program were well under way, and erection will be completed this year.

Besides the esimated initial annual operating savings, many other benefits will accrue to the company by the rebuilding and new installation program. As each part of the reconstruction has been completed, it proved to be the most efficient that the best engineering could provide; working and safety conditions are greatly improved; most important of all, the work was done while the plant continued to operate at full capacity. The new facilities permit greater production in the future; and new and increased kiln capacity is now under way.

A view from quarry bed toward the primary crusher building, showing the transfer tower containing the impact (secondary) crusher, and the raw material storage silos.

The modernization which this article covers is the first stage, which includes the unit pulverizers in the kilns, rock haulage improvements, new crushing plants, raw material storage handling, a new car-unloading station, and the electrical additions.

Geologically, the formation of rock over the entire property is located in the Jacksonburg formation of Ordovician age, subdivided into two members, one of limestone, comprising two-thirds of the thickness of the formation, and a lower one-third, known as the "cement-limestone" member. The strike of the formation is east-west, with an overall dip of about 30 degrees to the north.

As will be seen from the picture showing the quarry face, drilling follows a consistent pattern, with holes averaging about 170 to 180 ft. in depth, at a 20-ft. spacing and a 22-ft. burden. The face of the quarry now averages around 173 ft. Loomis "Clipper" drill rigs are used, operating bits 5-5/8 in. in diameter. Atlas or Trojan powder is used, in

A 2½-cu. yd. shovel loading a 20-ton tractor-trailer which carries rock to primary crusher.

A 20-ton tractor-trailer dumping rock into the primary crusher. Note the overhead crane and the hoist beam track.

4½-in. diameter cartridges. An average hole was loaded with 200 lb. of 70-percent dynamite for the lowest 26 ft. of hole, 200 lb. of 60-percent for the next 25 ft., 1,350 lb. of 50-percent for the next 44 ft. and 50 lb. of 40-percent for the next 53 ft., at intermediate spacing of the powder in this section. Stemming averaged 14 ft. On another particular shot of eight holes, yield averaged 6,585 tons of rock per hole, for a total of 51,245 tons, produced with 14,150 lb. of powder, or 3.6 tons per lb. of explosive.

Two Marion Model 4101 shovels with 2-cu. yd. buckets are used for loading rock in the quarry. Three Mack Model B42X tractors with 20-ton Easton Model TP1520 side-dump trailers take the rock from the shovels to the primary crusher, an average round trip haul of about 2/3 of a mile. The whole quarry setup was designed for a production of about 300 t.p.h., but this has been exceeded on several occasions. The first use of trucks in place of car hauling was on April 15, 1955.

The General Electric cable used to carry current to the shovels is supported over the trucking path on an insulated framework of light steel angles. Electric power is generated in the company's own power plant with three generators, two of these producing current at 4,160 volts and one at 480 volts. Current at 13,000 volts is reduced by means of transformers to the 480-volt, three-phase current used by equipment.

Trucks are dumped into the feeder and primary crusher by means of an Easton Model HE-20 automatic electric truck-dumping system. Two overhead hoists are installed in the primary crusher building. One of these units is a 20-ton Manning, Maxwell & Moore crane used for repairs to the crusher, the other a 5-ton Shaw electric hoist which runs the entire length of the building on a single beam-track. This hoist is used for miscellaneous work above the crusher and for operating the stone hook.

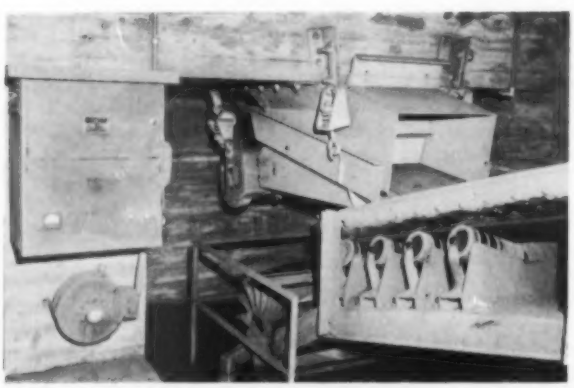
The entire operation, starting with dumping of trucks to discharging into the raw material silos, is controlled from a cab set over the feeder in the primary crusher building. This cab house is heated and enclosed in wire-glass panels. Its location permits a good view of the feeder below, as well as of the trucks while they are being dumped.

The primary crusher is an Allis-Chalmers "Fairmont" Type B single-roll crusher, 36 by 60 in. in size, with a setting of about 2¼ in. It is fed by a 60-in. by 21-ft. 3-in. Pioneer-Oro manganese apron feeder set level. Feeder pans ⅞ in. thick are designed to travel in either direction; they are over-lapping, and have a supporting lug on the outside. The primary discharges onto conveyor belt No. 1.

This conveyor belt discharges into a Pennsylvania Model CF-15-50 reversible Impactor set in the secondary crusher station. Its rotation reduces by direct impact at controlled slow speeds, producing rock of uniform size. This Impactor has a capacity of 520 gross t.p.h. It discharges onto conveyor No. 2, which carries the material up to the top of the transfer tower. This belt discharges onto conveyor belt No. 3, which returns the materials to two 5- by 12-ft. Tyler Ty-Rock Model F600 double-deck full-floating, circle-throw screens. The top screen cloth in these is 1¼-in. square mesh, and bottom ⅞-in. mesh.

Rejects or overs of plus 1¼ and plus ⅞-in. materials on both these screens are chuted back into the Impactor for further reduction. Rock through the ⅞-in. mesh goes up on conveyor belt No. 4 to the top of the cement-rock silos, where it is discharged by gravity into silos No. 1 and No. 2, and by means of conveyor belt No. 5, into silo No. 3, 50 ft. from the discharge point of conveyor No. 4.

To one side of the transfer tower station, space has been provided for



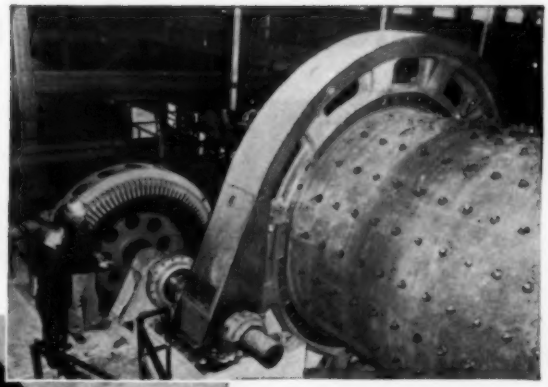
Left: This electric vibrating feeder reclaims stone from the reserve pile by means of conveyor belt No. 3, which discharges to the screens.

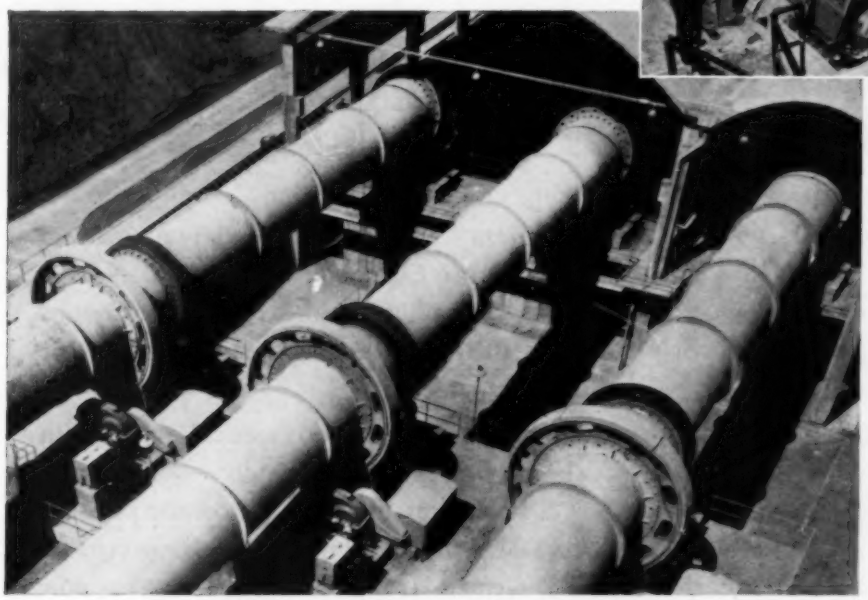
Below left: The loading end of conveyor No. 4, receiving chuted discharge from screens above. Note the dust collector connection.

Below: One of the two fully-enclosed double-deck vibrating screens with 1¼-in. and ⅞-in. cloth. Note the dust-collector connection.

FALK

Modern Gears for Modern Needs





ABOVE: A 10 ½′ x 12′ ball mill with Falk helical gear and Steelflex coupling.

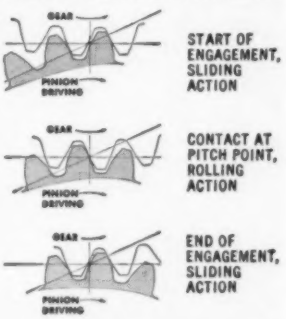
LEFT: 10′ x 340′ rotary kilns driven by Falk single helical gears, reducers and Steelflex couplings.

•

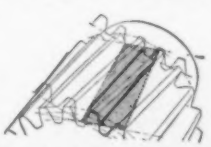
GEAR FACTS FOR ENGINEERS

As each spur gear tooth picks up the full load, the relative motion between the driving and driven tooth is a sliding action. As rotation continues, this motion becomes rolling at the pitch point, changing to sliding action again as the tooth advances toward disengagement.

PHASES OF INVOLUTE GEAR TOOTH ACTION



Helical gears have several teeth sharing the load. Teeth are simultaneously in all phases of contact across profiles, with contact starting at the tip of the teeth and extending obliquely to the base, thus reducing unit pressures. Also, portions which are rolling will limit the pressure exerted on portions which are going through sliding.



When abrasive materials contaminate the lubricant and get into the gear mesh, the more one can limit pressures in sliding areas, the less grinding action (hence wearing away) there will be.

Are your costly gears wearing out? Falk Helical Gears wear in!

Operators and engineers know that the action of ever-present abrasive particles on gear teeth is the arch-enemy of gear performance and gear life. They know that, when spur gears are used, abrasion tends to damage the tooth profile (thus lessening the smoothness of power transmission)—and ultimately destroy the gear teeth.

The sure way to reduce costly gear damage to an absolute minimum is to use Falk Precision-Hobbed Helical Gears. On these, the gear teeth are on a helix; this means that all phases of profile contact ("rolling" and "sliding") exist at the same instant. Pressure and abrasive wear on "sliding" tooth surfaces are reduced, smooth transmission of power is assured, and *the life of gears and connected machinery is extended.* With several teeth sharing the load at all times, the teeth actually wear themselves *in,* instead of *out!*

You will find long-range economy in specifying "Gears by Falk" whenever you expand or revamp your facilities. Falk is *the manufacturer* best prepared to recommend and produce the exact helical gear—single or herringbone type—most suited to your application. Falk's leadership in precision gearing is recognized the world over.

Consult the Falk representative nearest you—
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Some of the reasons for this record of highly efficient, economical rotary kiln firing with wet or dry coal of widely varying grades, include:—ball-bearing grinding . . . heavy duty construction . . . low maintenance . . . automatic pressure lubrication . . . closely controlled rate of delivery of uniformly fine coal to burners, regardless of wear of grinding elements . . . high availability . . . low power consumption.

On the record, for uniform performance in the direct-firing of any type or size of rotary kiln, you can depend on B&W Type EL Pulverizers. The Babcock & Wilcox Company, Boiler Division, Process Equipment Dept., 161 East 42nd Street, New York 17, N. Y.

BABCOCK & WILCOX

BOILER DIVISION

C-209

Capacity Year

The cement storage silos (left), the coal storage pile (right rear), and the screening and secondary crushing house (center).

One of six weighing feeders used to proportion raw mix out of the storage silos and feed it via belts to the raw mill dryers.

the storage of minus 7/8-in. rock. This reclaim pile is stocked by truck delivery from a chute at the bottom of the No. 3 silo. To reclaim the material it is fed into a hopper located over a Jeffrey Model 4D 30- by 60-in. electric vibrating feeder, by means of a bulldozer, or a clamshell bucket on a service crane in the yard. This feeder discharges to conveyor belt No. 3.

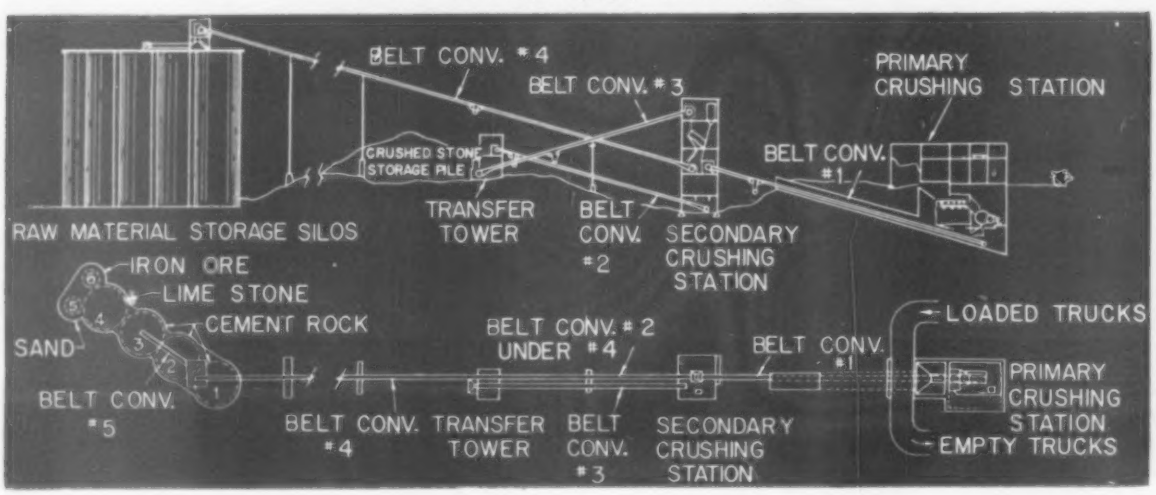
A Pangborn Model 695 type CH2 (rapper type) self-cleaning dust collector is installed on the top floor of the Impactor building. This system vents all loading points in the building, as well as similar points in the primary crusher building, by means of a blower and a system of ducts reaching those points.

Coal (1/3 anthracite and 2/3 bituminous), limestone, and iron ore come to the unloading plant via railroad cars, while sand is brought to the 250-ton capacity hopper by trucks. A Hewitt-Robins car shakeout is installed for cleaning out all materials from the incoming cars. The hopper feeds materials onto a feeder conveyor (No. 6), a 36-in. by 20-ft. belt discharging onto conveyor belt No. 7, which carries the incoming materials to the transfer station at the top of the old coal silos. An operator located in the unloading station can operate a motorized gate at the transfer station so that the coal is discharged by gravity into either the anthracite or bituminous silos. Other materials are discharged onto conveyor No. 8 going to the raw material silos where the limestone, iron ore and sand can be deposited in the proper silos.

The flop gates on the raw-storage silos are operated manually, but they are equipped with electric controls which cause a light to show at the unloading station to warn the operator if any materials are about to go into the wrong silo.

Anthracite coal comes into the plant in hopper cars. No. 4 and No. 5 (buckwheat) sizes of coal are used, (passing a 3/8-in. mesh) which makes it necessary to seal the car bottoms

Plan and cross-section of conveyors moving raw material (below) and incoming materials (opposite page) to storage silos at Whitehall Cement Manufacturing Company plant, Cementon, Pa.



with excelsior to prevent loss through the openings around the hopper car doors. As the coal goes down onto the grizzly feeder, a "cotton-picker" removes the excelsior by combing it off the grizzly. A grizzly with 2- by 1-in. openings at the bottom of the bituminous coal silo removes any lumps of this fuel larger than this size.

Raw mixes of materials are proportioned out of the storage silos by means of six Merrick Feedoweights installed over the 30-in. belts passing under the cement-rock silos and the 24-in. belts under the limestone, iron ore, and sand silos. All these feeder belts discharge onto conveyor No. 9, which in turn discharges onto belt No. 10. This conveyor feeds the proportioned raw mixes by gravity into the elevators supplying the raw mill rock dryers.

The sand and ore silos are 15 ft. in diameter and 90 ft. in height from the top of the silo to the bottom of the hoppers; they have capacities of 800 tons of sand or 900 tons of iron ore. Each of the 2,450-ton cement rock and limestone silos is 30 ft. in diameter and 90 ft. high. This silo setup provides five or six days' supply of cement rock. In case of a breakdown, material can be procured in the interim from the reclaim storage pile. A 1,200-lb. capacity Otis elevator is installed for access to the top of the silos.

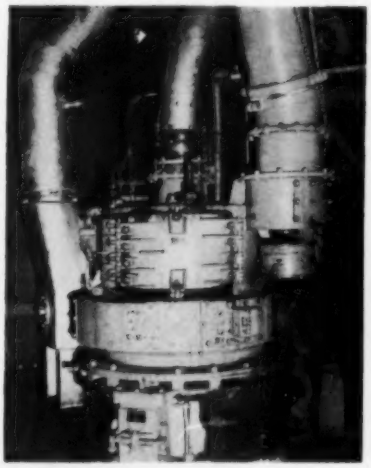
All conveyor belts are by U. S. Rubber Company, the idlers by Hewitt-Robins, and the couplings by Falk. Belt bearings at the head, tail, take-up, and bend pulleys are Dodge Type C Timken roller bearings. The following data is presented on the ten major conveyor belts used in the two systems, from the crusher and unloading stations to the raw material storage silos.

Belt No.	Width in in.	Length in ft.	Capacity in t.p.h.
1.	36	250	300
2.	36	160	600
3.	36	150	600
4.	30	450	400
5.	30	50	400
6.	36	20	54
7.	24	350	200
8.	24	330	200
9.	24	130	150
10.	24	165	150

The structural steel supporting all belt conveyors was furnished by the Bethlehem Contracting Company, Bethlehem, Pa. All progression of conveyor belts is interlocked electrically through a control panel. All belts are equipped with sliding take-ups and Stephens-Adamson cleaners.

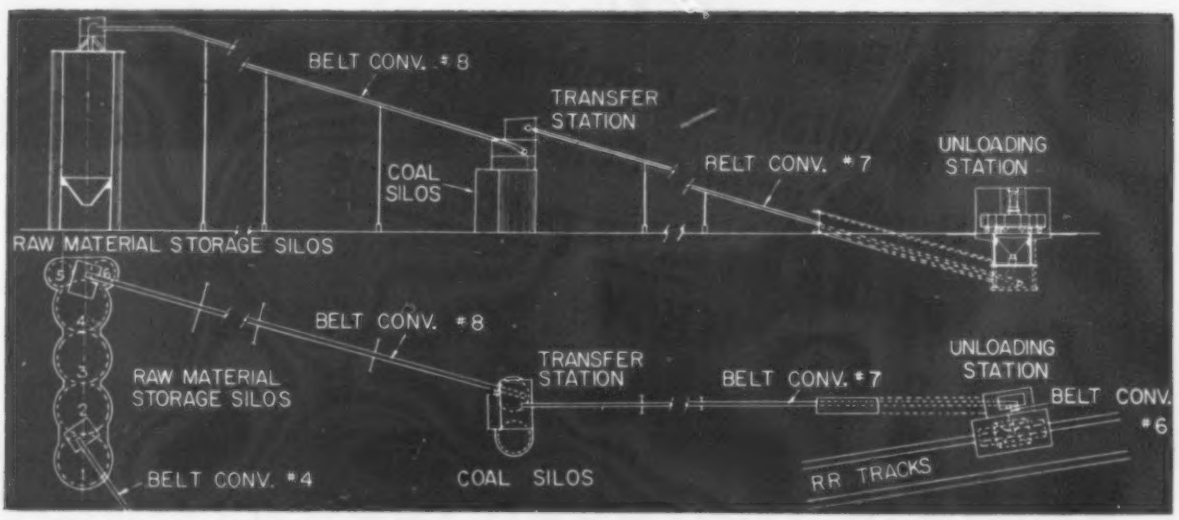
An R.C.A. Universal metal detector is installed immediately following the loading point on conveyor belt No. 1. Upon detection of metal, a bell rings in the operator's cab above the primary crusher, and the feeder above that crusher is stopped. Twelve seconds later the crusher and belt No. 1 are stopped, and the operator can hand-pick the metal piece off the belt as it emerges from below ground.

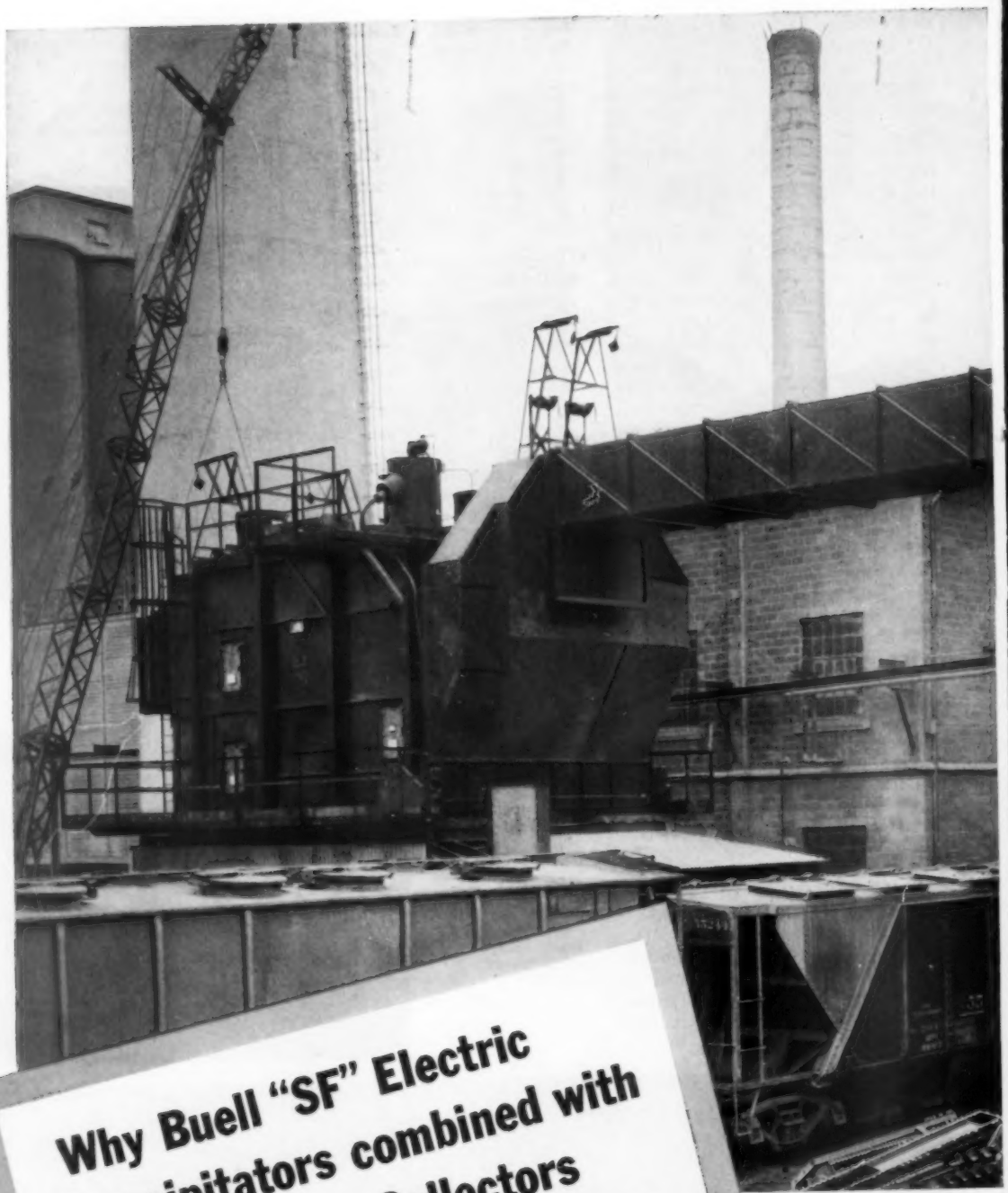
The Whitehall plant uses five Vulcan cement kilns 8 ft. 6 in. diameter by 120 ft. in length, and one 10- by 120-ft. kiln. Prior to August, 1954, the date of installation of the



One of six new direct-firing pulverizers installed on the kilns. These are set on the floor below the kiln level.

Left to right: J. W. Pastorius, vice-president; R. H. Foster, superintendent; W. F. Mackenzie, chief chemist; F. E. Storch, director of safety and personnel; P. C. Brown, superintendent of power.





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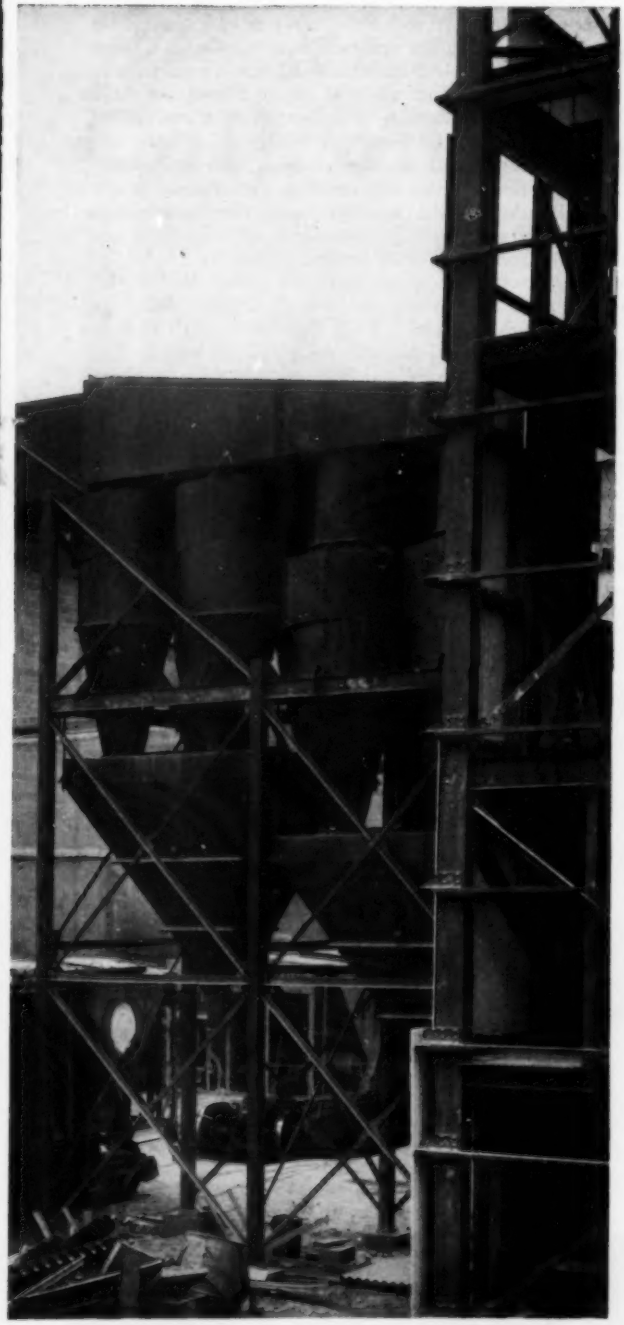

When Buell "SF" Electric Precipitators and Buell Cyclone Collectors are installed in tandem ... you have the ultimate in efficiency *under all conditions.* Because their basic principles of operation are different, they complement each other in such a manner as to provide two important advantages: (1) increased efficiency, and (2), improved stability. For example, changes in the characteristics of dust particles or gases will not appreciably affect the percentage of efficiency of the combined units.

Buell "SF" Electric Precipitators with their exclusive *"Spiralectrodes"* are unequaled in the recovery of fine dust particles. Featuring continuous rapping and many other exclusive design advantages, they are your guarantee of that all-important extra percentage of efficiency—often the difference between a highly profitable recovery operation and a break-even one.

Buell Cyclone Collectors with their large diameter, clog-proof design, also offer you the kind of efficiency that results in many extra tons of recovered valuable dust. Whereas the secondary air currents in most collectors tend to lower efficiency, Buell's exclusive shave-off design utilizes them to recover more dust.

For detailed information on how Buell equipment is delivering that all-important extra percentage of efficiency in the cement and lime industry, write Dept. G-18, Buell Engineering Company, 70 Pine Street, New York 5, New York.

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unit pulverizers, coal was dried in three rotary dryers and ground in four 42-in. Fuller mills. Pulverized coal was stored in bins and fed by means of screws into the air stream leading into each kiln.

The new installation makes use of five Babcock and Wilcox Type EL23 pulverizers for the smaller kilns and one Type EL29 for the large kiln. Coal is now fed by screw conveyors to bins above the unit pulverizers. Two percent moisture in the iron ore is about the maximum which can be handled without choking the silo. The iron ore which the company uses is a by-product of copper smelting, rather than iron ore, *per se*.

Electric motors in the plant are mostly General Electric and range from the 600-hp. unit on the Babcock and Wilcox grinding mill and 500-hp. size which drives the Impactor, to the smallest 5-hp. motors used on the apron feeder. The Allis-Chalmers roll crusher is driven by a 250-hp motor through V-belt and gear drives. V-belt drives are mostly by Gates.

Additions made in the electrical systems include completely new G-E distribution switch gears and six new G-E transformers. A special feature is an I-T-E mechanical rectifier, made by the I-T-E Circuit Breaker Company, for changing a.c. to d.c.

The entire new installation—from the shovels to the stone dryers in the raw mill—was designed, after a preliminary survey, by W. R. Bendy, cement consulting engineer, of St. Louis, Mo. The present setup produces about 2,000,000 bbl. annually, based on a daily production of 5,800 bbl. of cement, in which a 5-percent downtime is figured. The total employees include 225 hourly workers, 23 foremen, and 8 members of management personnel.

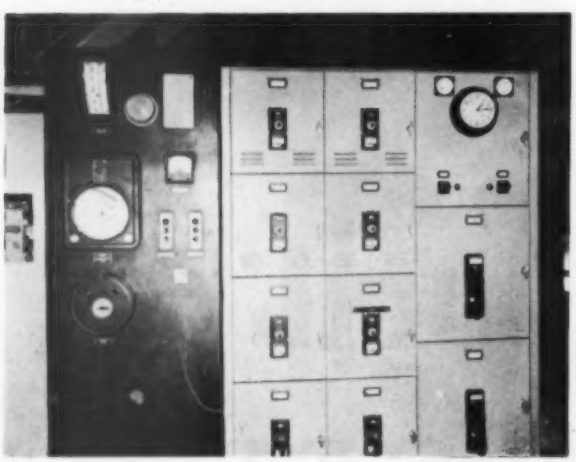
At present the company has under construction ten finished-cement silos, each 30 ft. in diameter by 158 ft. in height, built in two rows, with four intermediate star-bins. These will have railroad tracks underneath, and all will be equipped for bulk loading of cement. Under one side of the silos ten Fuller Air-Slides will be installed, which will empty the silos and stars on the opposite track. Six Streeter-Amet electronic scales will be installed for weighing the cars of cement.

Whitehall also plans for the installation of a 2,400-bbl. daily capacity F. L. Smidth kiln, 10 ft. 6 in. in diameter by 150 ft. in length. This kiln will be equipped with a Humboldt pre-heater, made by the Fuller Company, and a Fuller 6- by 33-ft. cooler, with air-quenching inclined grates and appurtenant homogenizing tanks, etc. Under an earlier program, four Heine waste heat boilers were installed, to operate on the waste heat from the kilns. Each of these has a capacity of 20,000 lb. of steam or water per hour.

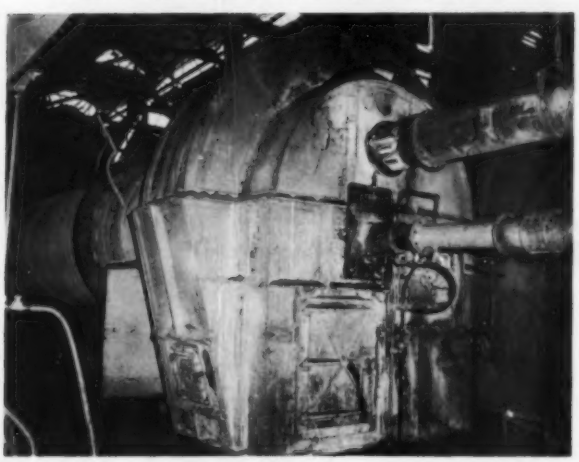
The general contractor on the first stage of the plant modernization was E. C. Machin, Inc., and the electrical contractor was Orlando Diefenderfer, both of Allentown, Pa. Chester S. Crawford is president of the company, and James W. Pastorius is vice-president. Other supervisory personnel at the Cementon plant include Richard H. Foster, superintendent; P. C. Brown, superintendent for power; William McKenzie, chief chemist; and Fred E. Storch, safety and personnel manager.

Left: The reclaiming crane in yard handling minus 7/8-in. rock in the reserve pile.

The kiln burning panel and motor control board for the six kilns.



The burner end of one of the six 120-ft. kilns now in use.



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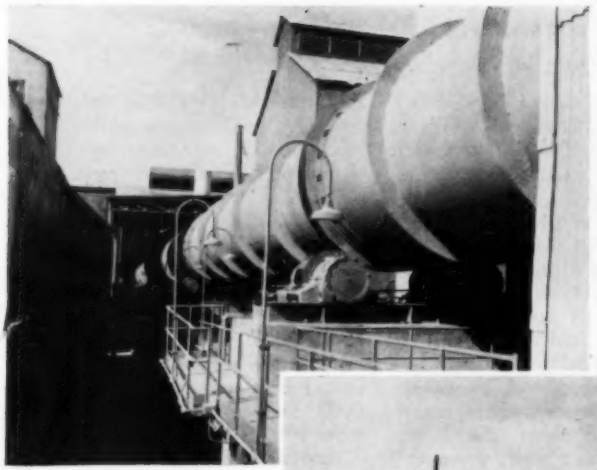

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Penn-Dixie Increases Capacity At Petoskey 50 Percent

By WALTER E. TRAUFFER

Another ON THE SPOT Report

THE Penn-Dixie Cement Corporation's Plant No. 10 at Petoskey, Mich., is one of the many which have been or are being expanded to take care of the continually increasing demand for cement. Originally built by the Petoskey Portland Cement Company in 1921 with two kilns, this wet-process plant has been expanded and improved over the years to keep up with the demand and with modern practices.

In 1925 two more 10- by 150-ft. kilns and the necessary related equipment were installed, increasing the capacity to 5,000 bbl. daily. This plant was taken over by Penn-Dixie in September, 1954, and plans were begun immediately for further expansion. The quarry was changed over from steam locomotive to truck haulage, and a new crusher building was completed in November, 1955. A new kiln and raw finish mills went into operation in February, 1956, increasing capacity 50 percent to 7,500 bbl. per day.

The original quarry immediately adjacent to the plant was worked out 20 years ago, and another one was opened just south of it. This deposit was worked at the 40-ft. level until just recently, when the increasing depth of overburden and the length of haul led to the decision to open a second (25-ft.) level. This put the new quarry floor below the level of Lake Michigan, which is only a few hundred feet away. In spite of the broken and stratified nature of the limestone, there is no apparent seepage from the lake. Spring seepage and surface water are taken care of by a sump and pump in a corner of the quarry. There is nothing unusual about the quarrying methods, churn drills and delay blasting being used. However, due to the rock formation, secondary shooting is not necessary.

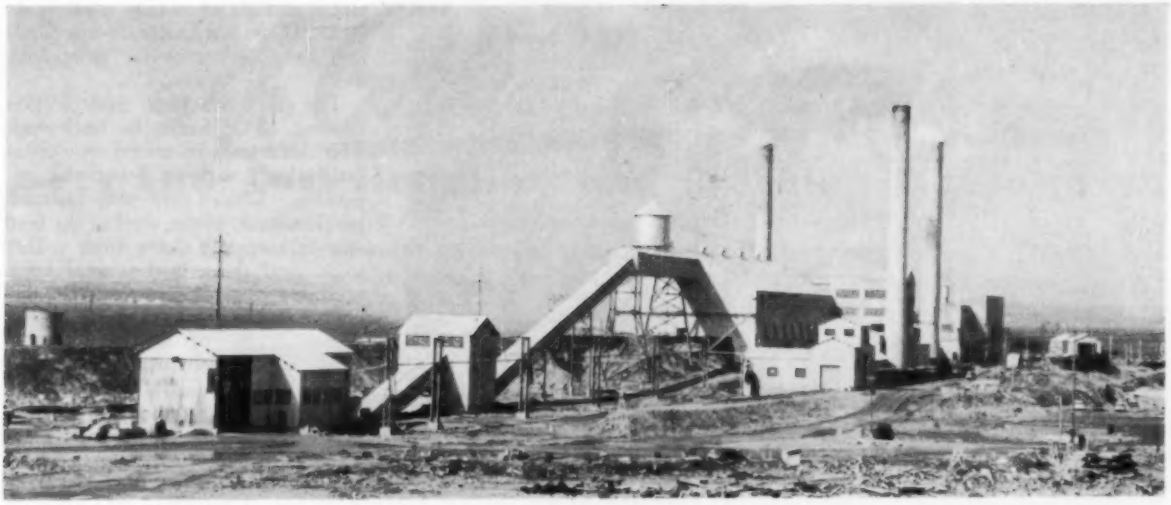
Two Marion electrical shovels—a 111M with a 3½-cu. yd. dipper, and an M93 with a 2½-cu. yd. dipper—load the stone into five Autocar heavy-duty quarry trucks with 20-ton rear-dump bodies—four Easton and one Moore. The trucks are powered by Cummins diesels. They haul about ¼ mile to the new crusher building, where the stone is discharged on a 60-in. by 43-ft. Hammermills, Inc., heavy-duty apron feeder. This feeder is long enough to insure a steady feed and is inclined to discharge into the primary crusher, an HMIRO6 Hammermills, Inc., Bulldog non-clog hammermill with a moving breaker plate. This unit has a rated capacity of 500 t.p.h. and is driven by a 500-hp. motor.

A short belt conveyor collects the fines which drop through the apron feeder. This material, with the minus-6-in. crusher product off a 5- by 18-ft. Link-Belt pan feeder, is carried by belt conveyor No. 1 (42 in. by 212½ ft.) to the top of the screening building. There are two 6- by 14-ft. Tyler Ty-Rock 2-deck Type F screens, one of which is kept in reserve. The screen in use has 1¼ and ⅝-in. wire cloth. The ⅝-in. plus material over both decks is carried on belt conveyor No. 2 (36 in. by 150 ft.) back to the crusher building. There it is discharged into the secondary crusher, a No. CB15-50 Pennsylvania reversible Impactor. This unit is rated at 400 t.p.h. capacity and is driven by a 450-hp. motor. The minus ⅝-in. product of this crusher is discharged on conveyor No. 1, forming a closed circuit.

Minus ⅝-in. rock through the bottom deck of the scalping screen is mill feed. It is discharged on belt conveyor No. 3 (36 in. by 465 ft.) which is inclined for most of its length but is horizontal for its last 100 ft. in the raw material storage building. It is discharged where de-

new 11- by 375-ft. wet kiln supplements four 10- by 150-ft. wet kilns with waste heat boilers

The 3½-cu. yd. electric shovel in the quarry loading to one of the five 20-ton heavy-duty quarry trucks.



A general view of the Penn-Dixie plant at Petoskey, showing the new primary and secondary crushing buildings at the left.

sired by a self-propelled movable tripper.

The storage building has a capacity of 10,970 tons of crushed limestone and 19,450 tons of shale. A 96½-ft. span Whiting overhead traveling crane with a 4-cu. yd. clamshell bucket feeds these materials into proportioning bins—2 for stone, 2 for shale and 1 for sand.

The shale is from the company's quarry 40 miles south of the plant and is received in bottom-dump railroad cars. A Pioneer 5- by 39-ft. apron feeder discharges the shale to a 30- by 60-in. Pennsylvania single toothed-roll crusher. A 24-in. by 54-ft. belt conveyor carries the shale to a 42- by 48-in. Jeffrey Type B hammermill for final reduction. These machines are driven by 150-hp. motors. The hammermill discharges on a 24-in. by 216-ft. belt conveyor which is horizontal for most of its length.

Sand, obtained from a local source, is discharged from cars or trucks into the same hopper and follows the same circuit, but requires little crushing other than breaking down lumps. A tripper discharges the sand from the long belt conveyor to one side onto a 24-in. by 61-ft. conveyor — at right angles — which feeds to the proportioning hoppers. When shale is being processed, it is run straight over the tripper back onto the belt. It is then discharged from the end of this belt to a second 24-in. by 61-ft. conveyor, which discharges it to storage. Link-Belt conveyors are used throughout.

The three raw materials are fed from the proportioning bins in the desired proportions—the stone by two 36-in. by 4½-ft. Schaffer Poidometers of 153-t.p.h. maximum capacity, the shale by two 20-in. by 4½-ft. Poidometers of 15 t.p.h. capacity, and the sand by a 60-in. disc feeder. These materials are carried on individual 36-in. belt conveyors to the old equipment, which consists of another belt conveyor and a Link-Belt Peck carrier. This serves the new raw mill feed bins, as well as the four old ones for the 7- by 22-ft. Allis-Chalmers mills.

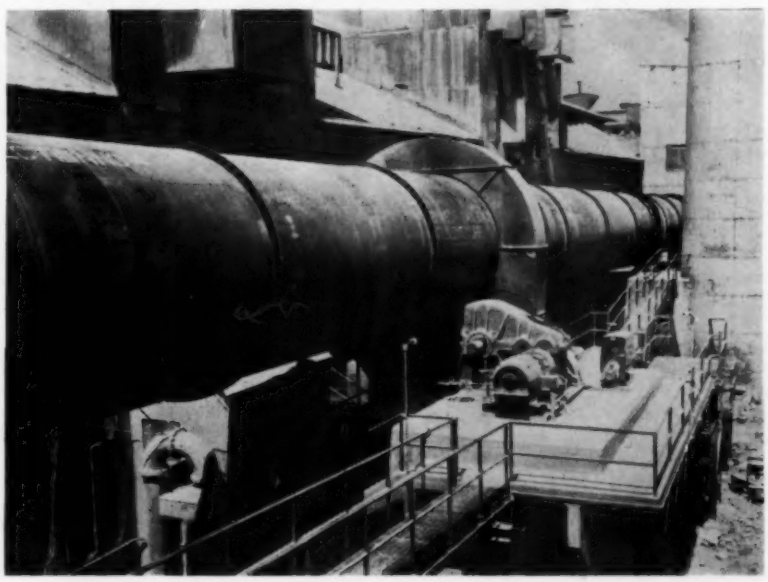
The raw mix for the new mill is fed at the desired rate by a 60-in. Kennedy-Van Saun disc feeder. The 9- by 30-ft. Kennedy-Van Saun 3-compartment mill is driven at the rate of 18 r.p.m. by a 1,000-hp. Electric Machinery 200 r.p.m. synchronous motor through a Cutler-Hammer magnetic clutch. This mill carries a 198,000-lb. ball load distributed as follows:

1st compartment—20,000 lb. of 4-in. balls; 20,000 lb. of 2-in. balls.

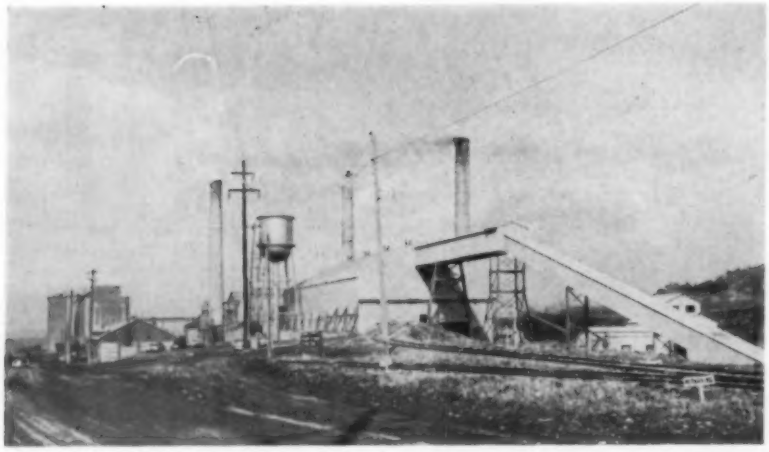
2nd compartment—20,000 lb. of 2-in. balls; 30,000 lb. of 1½-in. balls; 10,000 lb. of 1¼-in. balls.

3rd compartment—40,000 lb. of 1¼-in. balls; 30,000 lb. of 1-in. balls; 28,000 lb. of ⅞-in. balls.

Sheffield steel balls are used. Wedge-type liners are used throughout—Lorain in the first compartment and Herculite in the other two. Raw grinding is done to a fineness of 90



The new 11- by 375-ft. kiln and its motor and speed reducer drive. The stack for the old, shorter kilns is at right.



Another view of the plant with the stack for the new kiln in the center and cement storage silos at the left.

percent through 200-mesh, and enough water is added to make a slurry with 36 percent moisture.

The slurry is discharged into a sump from which a 4-in. Wilfley pump feeds to the eight original blending tanks; these are used for all five mills. The corrected slurry for the new kiln is fed by a 6-in. Wilfley pump into two 30-ft. diameter by 30-ft. high circular concrete kiln feed basins equipped with Dorr mechanical and air agitators. An interesting feature is that the slurry is pumped into the tanks at the bottom for better mixing. Two 4-in. Wilfley pumps can be used for interblending between the two tanks or for feeding from either or both to the Kennedy-Van Saun ferris-wheel-type kiln feeder. The overflow from the feeder goes by gravity back into either of the tanks. The slurry feed pipe into the kiln is connected to a screw feeder which blends in the dust from the kiln exit gases at a uniform rate.

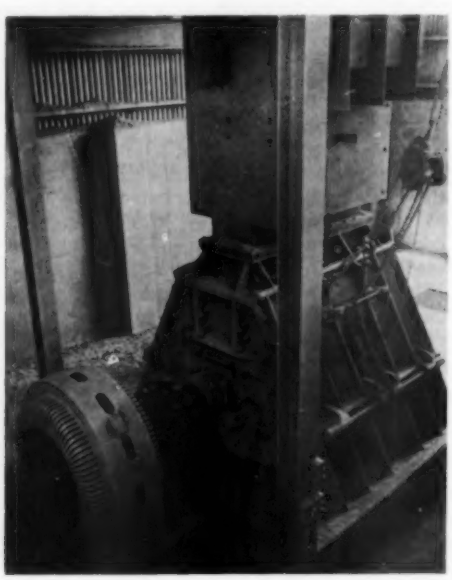
The new 11- by 375-ft. Kennedy-Van Saun kiln is all welded, with stiffener rings spaced approximately 20 ft. apart. It is mounted on six tires and one-piece forged steel rolls weighing 17,000 lb. each. A self-tightening counter-weighted seal ring is used at the feed end. The kiln is driven at the rate of 80 r.p.m. by a 150-hp. 1,200 r.p.m. Allis-Chalmers induction motor through a Dynamatic 170WC magnetic variable-speed coupling and a Foote gear reducer. This arrangement makes it possible to use a constant-speed motor, varying the speed of the kiln by means of the coupling. The kiln drive is synchronized with the feeder motor and automatically controls its feed. There is a LeRoi 38-hp. auxiliary gasoline engine for emergency use.

The kiln has a 76-ft. chain section starting 13-ft. from the back end. The chain is ⅝-in. round-type proof coil in loops with cross-sectional suspension. Chains are also fastened longitudinally to the shell at the feed end to keep the slurry from caking to it, and there is the usual brick retaining ring. Beginning at the discharge end of the kiln, the lining includes 5 ft. of abrasion-resisting brick, 75 ft. of 70 percent alumina, 16 ft. of Ritex, 62 ft. of 70 percent alumina, and 20 ft. of Super Duty spall-resisting fire clay brick (all 6 in. thick), 150 ft. of insulated firebrick (4½ in. thick), and 115 ft. of spall and abrasion-resisting brick (6 in. thick).

The kiln is fired by a No. 533 Raymond bowl mill driven by a 125-hp. motor. The mill has an adjustable-speed feeder, and drying air from the kiln hood is automatically controlled at 190 deg. F. and enters the 15⅓-in. i.d. burned pipe at 190 deg. A 75-hp. motor drives the mill fan. The four old kilns are fired by No. 412 Raymond mills, which were installed in 1937. Coal—13,000-B.t.u., low-ash—is received by boat. The fuel rate of the new kiln is 90 lb. per bbl. An arch over the burner pipe diverts the secondary air upward and prevents distortion or fluctuation of the flame.

The temperature in front of the chains where the slurry is nodulized is held as close as possible to 900 deg. F. In the burning zone the temperature is about 2,700 deg., and the exit

Left: The 43-ft. long inclined apron feeder which provides a steady feed to the primary crusher.



Right: The reversible hammermill secondary crusher with its 450-hp. motor.

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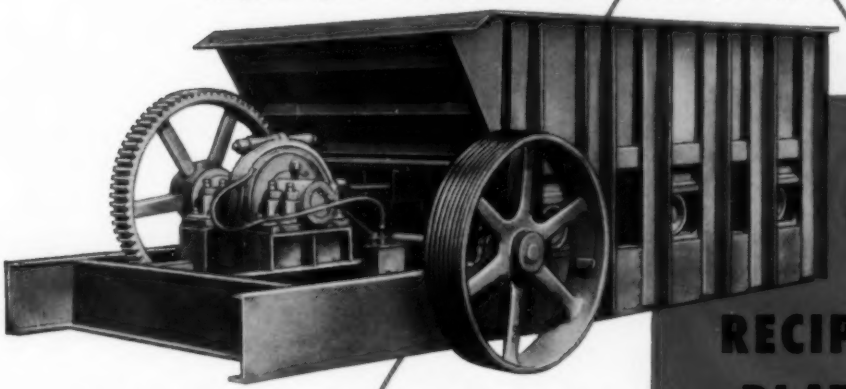

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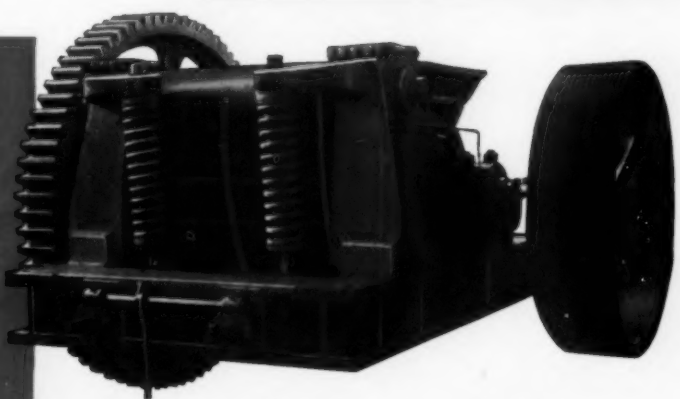

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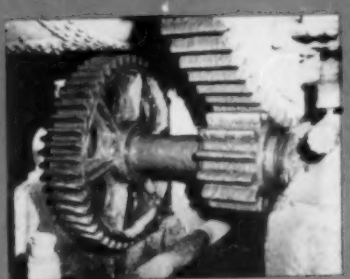
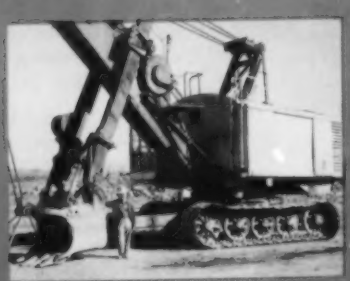
TSP main holding and closing drums on overhead crane. Note smooth and true grooves on TSP drums.

Rotary cooler showing TSP drive pinions and intermediate drive bull gear after several years service.

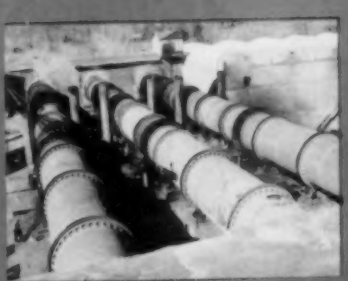


TSP main agitator drive pinion and intermediate drive bull gear after several years service.

TSP sprockets ready for installation on heavy double drag elevators.



Large shovel using TSP drive gears and pinions.



Clinker burning kilns driven by TSP pinions.

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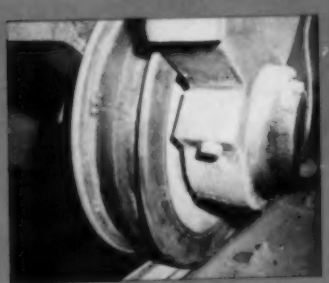
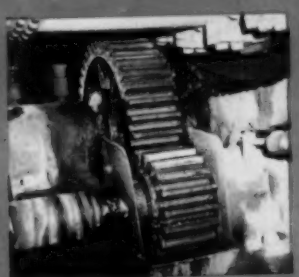


Close-up of TSP wheels on bucket crane after several years service.



TSP intermediate drive pinion and bull gear after several years service on clinker burning kiln.

Raw storage crane trolley using TSP gears, pinions, wheels, drums and brake wheels. Similar TSP parts are used on another overhead storage crane.

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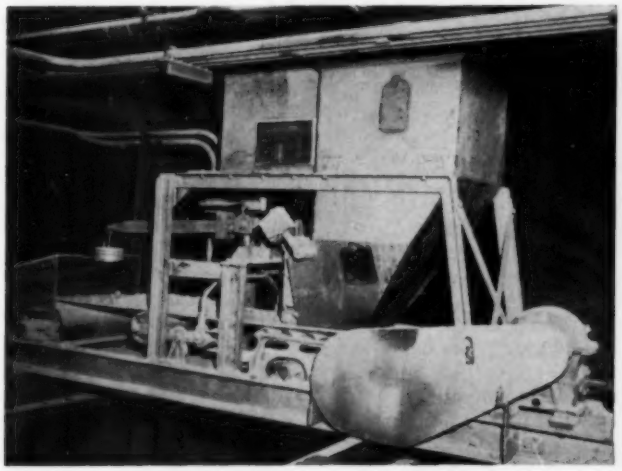
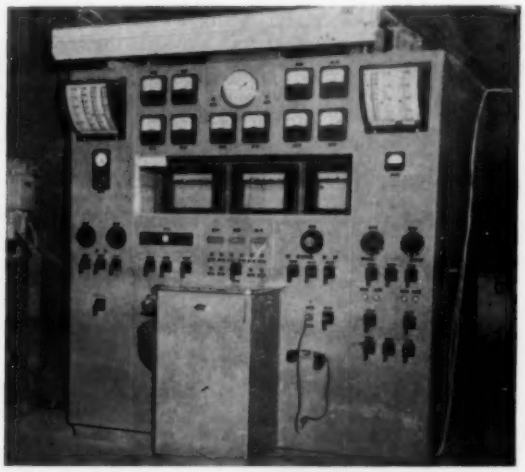


One of the weighing feeders which proportion materials for the raw- and finish-grinding mills.



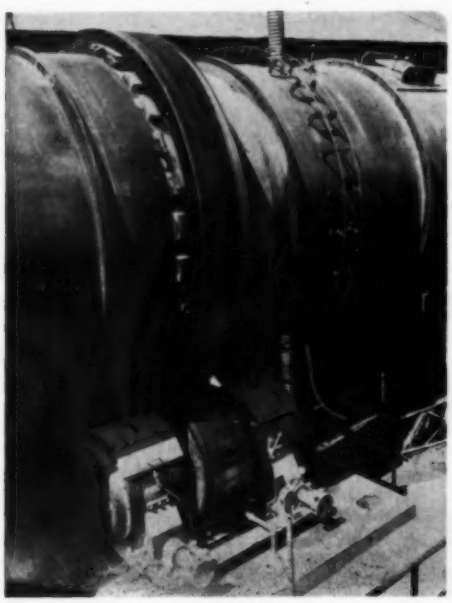
The control board for the new kiln, which is completely instrumented, including a recording oxygen analyzer.

gas temperature is about 550 deg. Exit gases pass through a dust chamber to a Buell Model 2 x 6, Bar Size 11A2, Type AC 130 dust collector, rated at 110,000 c.f.m. at 500 deg. F. Next is a No. 15 Type 5HL Buffalo induced-draft fan driven by a 250-hp. variable-speed motor. There is a motorized louvre damper, but the final draft adjustment is controlled by a fan with a speed range of 450-870 r.p.m. The 221-ft. Custodis concrete stack has a 10-ft. i.d. brick lining. The dust from both the dust chamber and the collector is fed by screw conveyors and elevator to a bin for feed back into the kiln.

The kiln control board has all the necessary instruments, as well as a centralized control cubicle. Recorders register the draft at the dust chamber and the kiln, slurry feeder, and coal feeder speeds. Others record the temperature in the cooler, at the entrance to the draft fan, at the dust chamber, at the front end of the chain section, and at the lining in the burning zone. A Beckman recording oxygen analyzer is used, and the oxygen content is held at 2 percent. The kiln is controlled by holding as close as possible to a constant kiln speed and varying the coal feed as necessary.

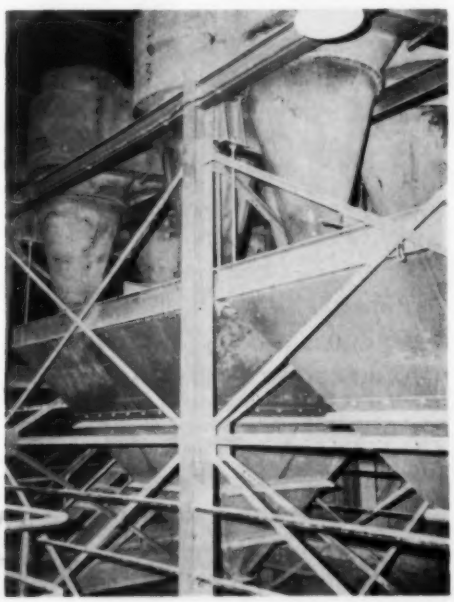
Clinker is discharged at a temperature of about 1,800 deg. F. to the 6- by 37-ft. Fuller inclined-grate air-quenching cooler. To this is connected a clinker breaker. The clinker is conveyed by a 14-in. drag chain to a series of two 36-in. Link-Belt Oscillator conveyors which are 39 ft. and 13 ft. in length, respectively. Two bucket elevators 88 ft. high feed to a 36-in. by 16-ft. Oscillator which discharges on a Tyler Niagara 1-deck screen with ¼-in. wire cloth. The oversize clinker goes to a 3-ft. Symons Short-Head cone crusher and is returned *via* a 13-ft. Oscillator forming a closed circuit. The minus ¼-in. clinker can go to the bin feeding the new mill or it can go to the old storage for the old mills.

Clinker is fed to the new mill by a 30-in. by 4½-ft. Schaffer Poidometer with a maximum capacity of 36 t.p.h. and gypsum by a Poidometer of the same size with a maximum capacity of 2,700 lb. per hour. Both discharge to a 60-in. drum feeder.



Left: A closeup of a kiln tire and roller, with the temperature recording system in the foreground.

Right: The multiple cyclone collector for the kiln exit gases, with hoppers below for feeding dust back into the kiln.



TORRINGTON BEARINGS

This is an 11- by 20-ft. Kennedy-Van Saun 2-compartment mill driven at 17 r.p.m. by a 1,250 h.p. Electric Machinery synchronous motor through a Cutler-Hammer magnetic clutch. This mill carries a 210,000-lb. ball load distributed as follows:

First compartment—30,000 lb. of 2-in. balls, 20,000 lb. of 1½-in balls.

Second compartment—50,000 lb. of 1¼-in. balls, 80,000 lb. of 1-in. balls, 30,000 lb. of ⅞-in. balls.

The mill discharges from its second compartment to a bucket elevator and a Fuller-Huron Airslide conveyor to a 16-ft. air-cooled Sturtevant separator. The rejects from the separator are returned by another Airslide conveyor to the feed end of the mill. Buell cyclone and Sly Dynaclone dust collectors are used.

Standard Type I portland cement is ground to a fineness of 3,300 sq. cm./gm. Blaine. Types Ia and III are also made. This cement and the product of the four old 7- by 22-ft. Allis-Chalmers tube mills with their 16-ft. Sturtevant separators are fed *via* an Airslide to the 8-in. Fuller-Kinyon pump, which feeds to storage silos of 350,000 bbl. capacity.

When built in 1921, this plant had two 10- by 150-ft. kilns and two Edge Moor 600-hp. waste-heat boilers. Two 1,000-kw. turbo-generators supplied power for the plant. When the plant capacity was doubled by a duplicate installation of two kilns, two 800-hp. waste-heat boilers were installed. A 2,000-kw. turbo-generator doubled the power output. In 1941 a 3,500-kw. turbo-generator replaced one of the original 1,000-kw. units, thus utilizing all of the steam produced. (For a complete description see PIT AND QUARRY, July, 1942, pp. 82, 3-73. These boilers then provided about 95 percent of the plant's power requirements.

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New Materials Handbook Covers Multiple Fields

The new *Handbook of Engineering Materials,* recently published by John Wiley & Sons, Inc., has been designed to provide engineers with maximum help in the selection and use of materials by incorporating in one volume a practical coverage of materials used in all branches of engineering.

Such information as historical background and manufacturing methods, usually found in materials handbooks covering one specialty, have been minimized, and only engineering data is presented. The book may be obtained for $17.50 from the publisher at 440 Fourth Avenue, New York 16, N. Y.

American Standards Issues Quarry Safety Procedures

The American Standard of Safety Procedures for Quarries was recently released by the American Standards Association. It is based on a National Safety Council publication entitled *Safety in Quarry Operations,* and was sponsored by the council with the agreement of its cement and quarry section.

Particular attention has been paid to safe procedures in dealing with explosives, operation of trucks and other quarry equipment, and procedures for eliminating certain frequent and serious hazards in quarry operation.

This standard, M28.1-1955, may be obtained for $1.50 from the American Standards Association, Inc., 70 East 45th St., New York 17, N. Y.

JAMES R. RADCLIFFE has been appointed to the general commodity division of the National Gypsum Company, Buffalo, N. Y. Mr. Radcliffe was formerly production designer at National Gypsum's research center in Tonawanda, N. Y.

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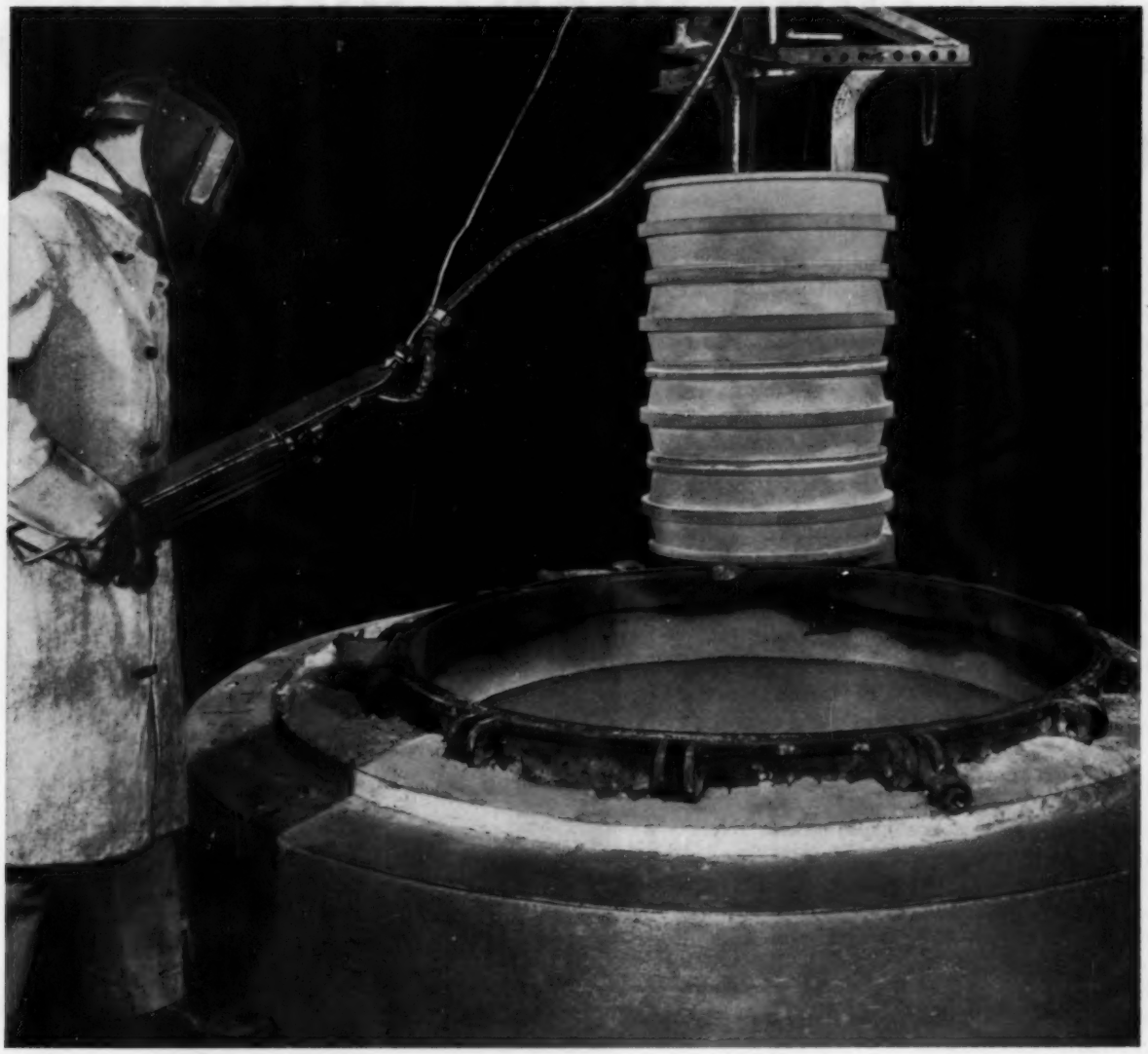

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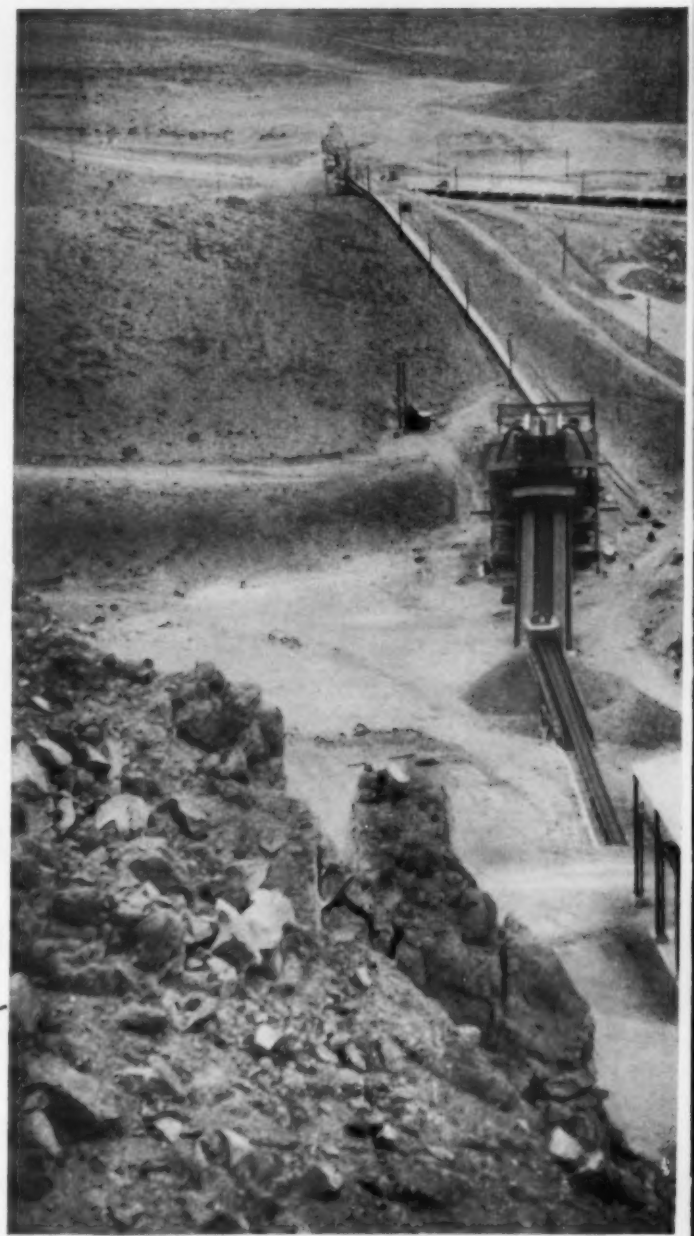
Belt Conveyors Carry Enough Stone to Fill a Car

This is the production schedule at the crushing plant, one of the largest producers of cement products in Southern California. One thousand tons per hour of limestone are crushed, processed and delivered to storage for loading into 85-ton dump hopper cars at the rate of one every three minutes. Engineers from the customer and from Hewitt-Robins worked closely in the development of this system, which utilizes Hewitt-Robins conveyors and vibrating equipment.

The 6" x 0" product of a primary crusher near the quarry face is elevated by inclined conveyor at 2000 TPH to an initial surge pile to supply a backlog for the secondary impactors. To further ensure continuity of operation, identical, independent belt conveyor systems operate side by side at 500 TPH each from the surge pile to duplicate screening and secondary crushing stations.

Here "overs" from the primary screens drop into impactors and are recirculated by conveyor to secondary screens. Secondary screen "overs" are fed back through the impactors. The ¾" "thrus" from all the screens are united by conveyors on a common 1100-foot, 1000-TPH conveyor terminating in a cantilevered boom for charging an 8000-ton storage pile. This storage pile is ample to bridge any gap which may arise between main plant requirements and quarry production.

Throughout the aggregates industry, Hewitt-Robins equipment and engineering know-how are thus helping to develop more economical production through increased mechanization.



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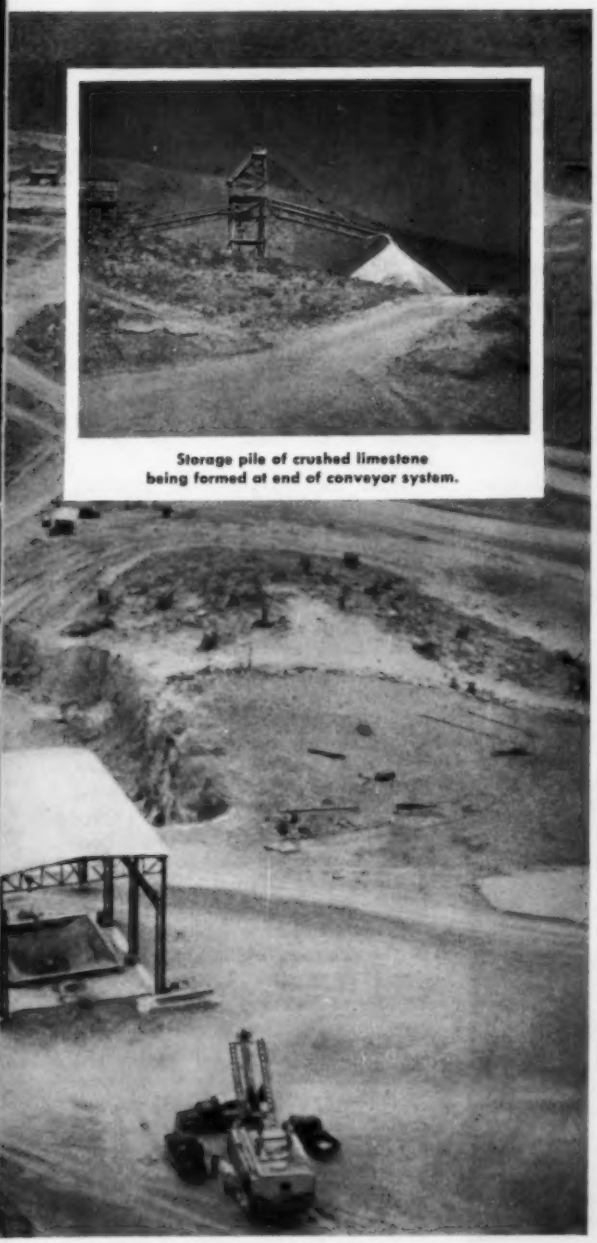

Storage pile of crushed limestone being formed at end of conveyor system.

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CONNECTICUT

Lone Star Enlarges Bonner Springs Plant

capacity raised 50 percent as part of $58,300,000 domestic plant program

By BUREN C. HEROD

Another ON THE SPOT Report

AS one of the nine domestic plants affected by a comprehensive $58,300,000 expansion program in which the Lone Star Cement Corporation is currently engaged, the Bonner Springs, Kans., operation of that company has realized an 800,000-bbl. increase in productive capacity over its previous normal output of approximately 1,600,000 bbl., bringing the total to 2,400,000 bbl.

Expansion of facilities to attain this new capacity involved virtually every segment of the operation. The crushing plant was enlarged and additional equipment was installed; a new raw mill was added, which also necessitated extending the raw mill building; a fourth kiln with its cooler, stack, blower, coal mill, and other associated equipment was installed; the finish grinding department was augmented with a new mill. Other additions and improvements include two new kiln feed tanks, a new control house for the crushing department, two coal bins for overnight service, and a conveyor installation to stockpile clinker in outside storage.

The general plan for this improvement and expansion project was conceived by Lone Star's own engineering department, and the McDonald Engineering Company was then retained to handle design details and construction. The program was initiated in January, 1955, and the contractor had the kiln installed and operating in November. By January of this year the crusher and rock storage buildings were enlarged and the additional equipment was in place. The new raw mill was also operative at that time. In March installation of the new finish mill was complete, as well as the new distribution and dust collection system above silo storage groups No. 1 and 2. By April all phases of the plant were in operation.

In this view of a part of Lone Star's Bonner Springs plant the new kiln feed tanks can be seen at the left center, and the new stack at the right center. Between them a portion of the new kiln is visible. Just beyond the tanks is the extension of the raw mill.

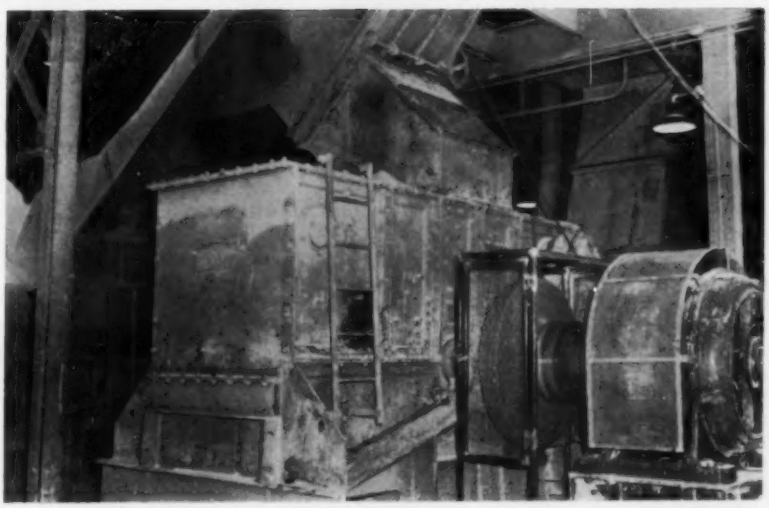
With the exception of gypsum, raw materials—limestone and shale—are obtained from a quarry on the property just west of the plant site. The formation being quarried—the Wyandotte—contains at this location upper and lower limestone strata with a shale layer between. The face averages 75 ft. in height. Conventional drilling, blasting, and loading operations are carried out on both limestone and shale, which are separately loaded into the quarry-plant haulage units. The latter are Dart and Mack 20-ton trucks fitted with Easton TRB-10 side-dump bodies. These replaced the old locomotive and quarry car haulage a few years ago.

Quarry run material is transported to the crushing plant hopper at the rate of approximately 400 t.p.h. Enlargement of the crusher building was done by moving the side walls out about 5 ft. and raising the roof the same distance. This was done to accommodate the additional secondary crushing and conveying equipment. It was necessary to shut down the crushing plant for a period of only three weeks for the final equipment installation and hookup.

Except for the primary roll crusher, the crushing operation is completely new. Actually the primary crusher drive is also new and consists of V-belts on Allis-Chalmers 10-groove sheaves. The rolls were also opened up a little more from

This apron conveyor transfers the primary crusher discharge to the two new secondary crushers.

Dust collection from all equipment in the crusher building is handled by this unit, which is mounted above the crushing department power substation.



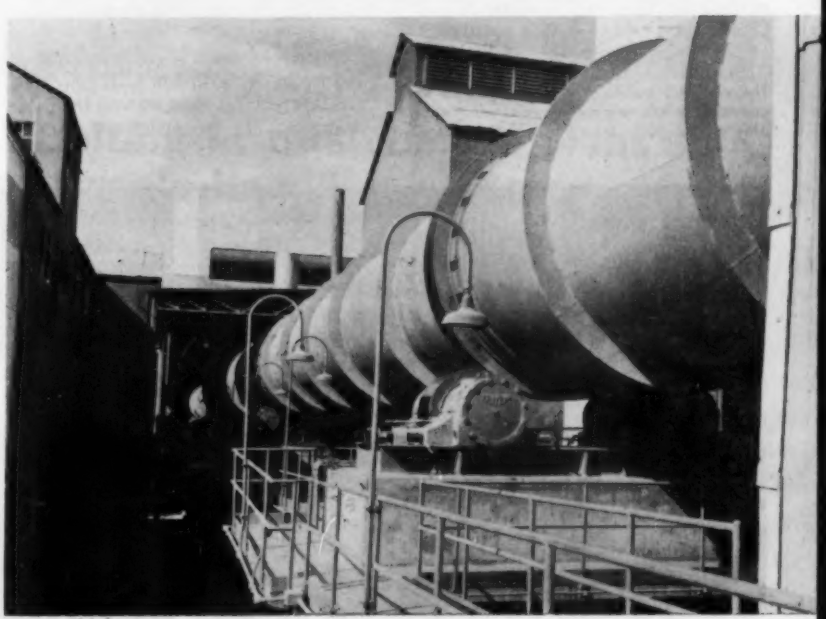
Right: Through the pantleg chute, above, this hammermill and its companion unit are supplied stone or shale for secondary reduction

the previous setting, and the primary now discharges a stone of about 4-in. top size as opposed to the 3-in. size formerly produced.

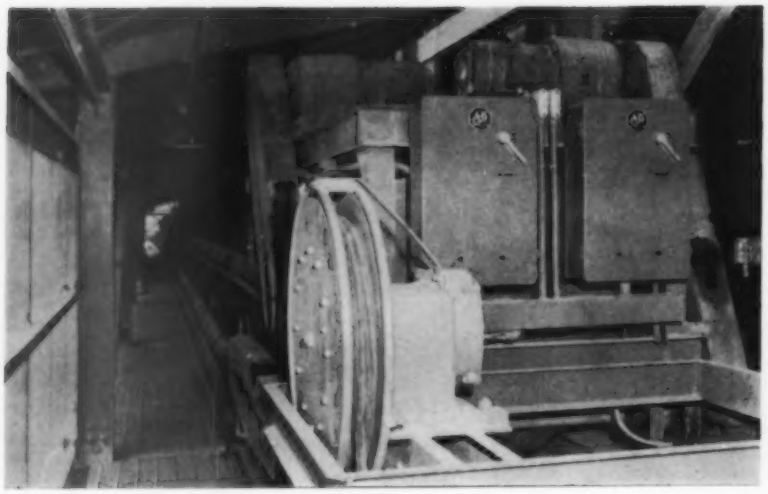
A 60-in. by 45-ft. Pioneer Oro feeder delivers stone or shale from the truck hopper to the Fairmont primary roll crusher, which in turn discharges to a 4- by 53-ft. Chain Belt Rex apron conveyor. Driven by a 50-hp. G-E motor through a Falk speed reducer, this conveyor discharges about 400 t.p.h. of material into a pantleg chute leading to the two new secondary crushers. These are Hammermills Inc. HM104 50- by 40-in. Non Clog mills that replaced the single hammermill previously used. One is driven by a 350-hp. Westinghouse motor; a 300-hp. G-E is installed with the other.

Each discharges stone of approximately ¾-in. top size to one of a pair of Chain Belt Rex bucket elevators, both of which are equipped with 30-in. buckets. With drive furnished by 40-hp. G-E motors through Falk speed reducers, each elevator raises about 200 t.p.h. of hammermill product to a shuttle conveyor in the rock storage building.

The expanded crushing plant is supplied with 440 volts by a new substation erected adjacent to the



Perspective of the new kiln from the feed end. This is a 10- by 340-ft. unit that operates at a maximum of 75 r.p.h.



Material reduced in the secondary crushers is elevated to this shuttle conveyor for distribution in the rock storage building.

crusher building. This new substation, which is supplied from the plant's main powerhouse, also furnishes power for the repair shop and for the overhead crane in the rock storage building. Installed on the substation roof is a Sly 18A Dynaclone dust collector which, with a 13,800 c.f.m. fan, collects from all units in the crusher building.

By means of a flop gate, the discharge from the bucket elevators in which the hammermill product is raised to the storage structure may be fed directly to a central bin above the reclaiming conveyor carrying stone from rock storage to the raw mill. Otherwise the crushed material is discharged to a 36-in. by 180-ft. Chain Belt Rex shuttle conveyor.

The raw mill building was extended to accommodate this new milling unit, which operates at 18.6 r.p.m on a 75-t.p.h. feed.

This unit was installed as an improvement to the earlier raw-stone storing operation. Formerly it was necessary for the overhead crane to shift constantly in transferring material as it arrived from the crushing plant to storage areas, and in rehandling stone to put it in the bins over the finish-mill feed conveyor. Another factor is the fact that when the storage building itself was lengthened by another 80-ft. on each end, this extension raised the previous rock storage capacity of approximately 7,000 tons by another 5,000 tons.

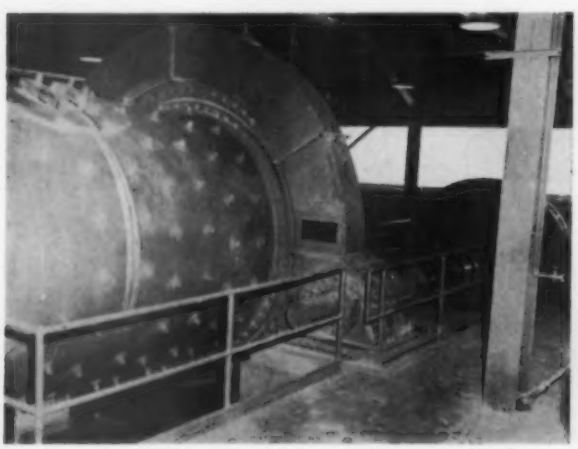
The shuttle conveyor which distributes limestone and shale, separately, to the various storage areas is driven by a 10-hp G-E geared motor. The belt itself is driven at 350 f.p.m. by a 15-hp. G-E gear motor. Material is then moved from the storage areas as necessary by the 3-cu. yd. overhead Whiting crane, which was installed in 1954. The crane supplies the bins in the center of the rock storage area; these bins, in turn, feed the raw mill belt conveyor through four discharge points.

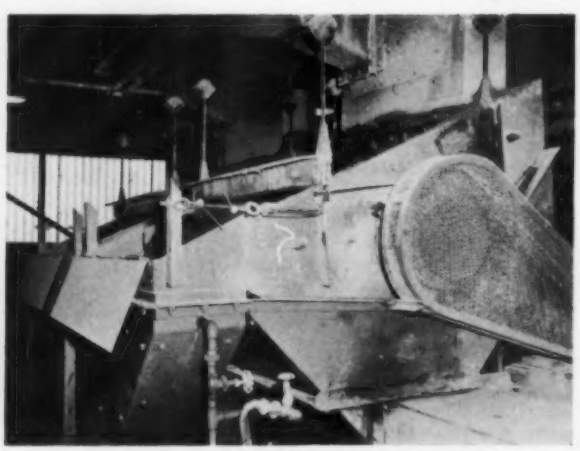
In the raw mill building the feed belt discharges to two bins from which two F. L. Smidth Kominuter raw mills are supplied, or to a drag conveyor that feeds a third Kominuter bin and another for the new raw mill. The building was extended to accommodate the new milling unit—a 10- by 12-ft. 2-in. Traylor mill. With drive furnished by a 600-hp. G-E synchronous motor, the new mill operates at 18.6 r.p.m. on an hourly 75-ton feed. This is equivalent to the combined capacity of the three older units, which are 8 ft. in diameter. The newer unit is charged with 100,000 lb. of balls ranging in size from 3½-down to 1½-in. while the Kominuters are charged with 12,000 lb. of balls up to 5 in. in diameter.

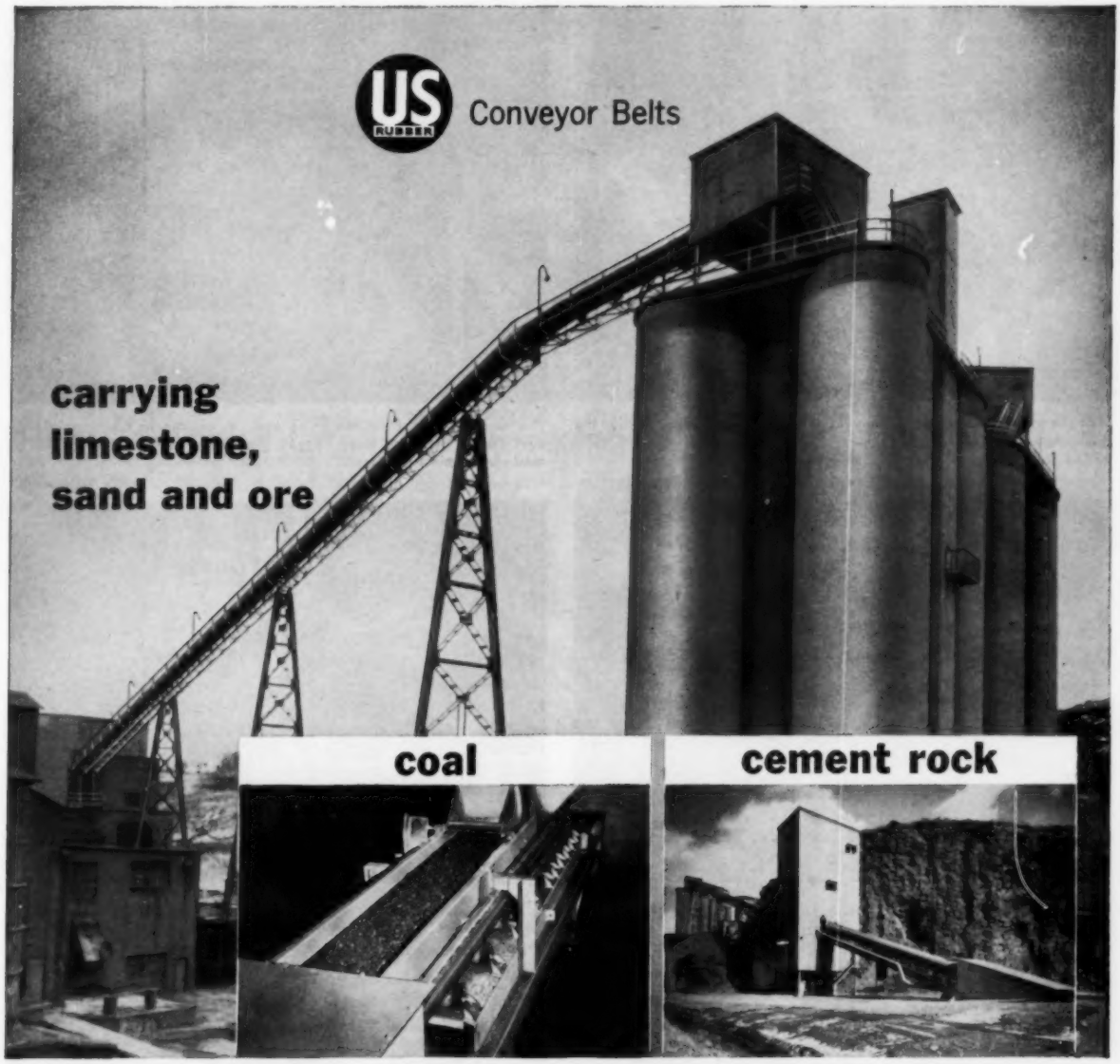
The Kominuter product is elevated to three Tyler Hum-mer screens, while that of the new mill is raised to a pair of Allis-Chalmers 5- by 6-ft. single deck Ripl-Flo screens. Material retained on all screens is returned to the feed end of the respective mill, while throughs are fed by screw conveyor to an agitating trough from which four 6¼- by 20-ft. tube mills are supplied for the secondary raw grinding.

By means of regular periodic checks the water content in the slurry discharged by the tube mills

These screens serve the new raw mill, returning retained materials for further primary milling, while the throughs are delivered to a screw conveyor for feed to the secondary tube mills.







it's 100% "U. S." Belting in this cement plant's new raw-materials handling system

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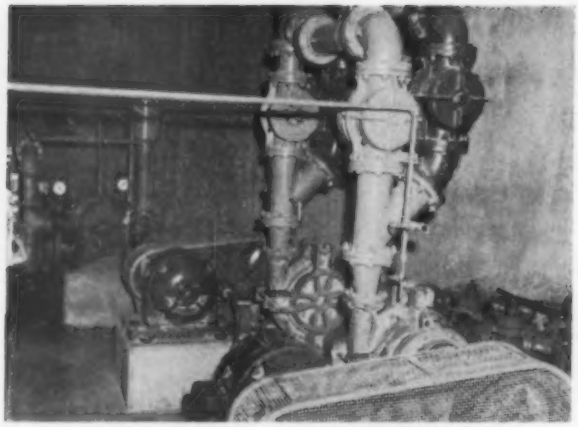
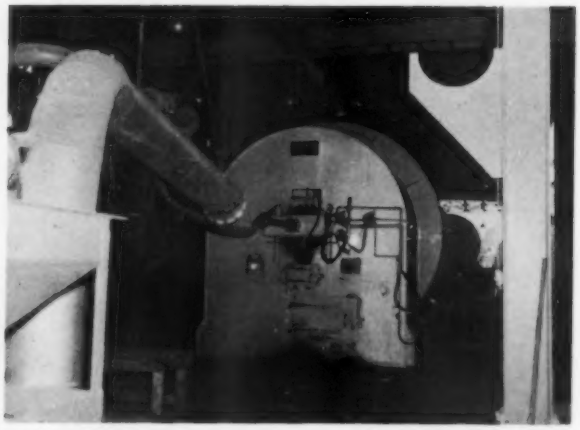
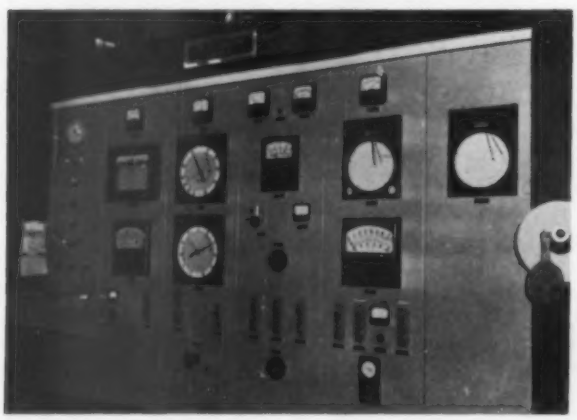


Slurry pumps and air compressor (background) housed in the pump house adjacent to the kiln feed tanks. All slurry lines are color coded to indicate kiln feed, return, etc.



The new kiln seen from the firing end. A change in fuel supply from coal (large diameter line) to gas (line seen entering hood) can be made in 30 minutes or less.



Recording and indicating instruments for the new kiln are mounted on this control panel. The second vertical section from the right carries the instruments pertaining to the operation of the new coal mill.

Auxiliary power to keep the new kiln turning in the event of interrupted electric power is furnished by the engine at the left.

is maintained at about 35 percent, and approximately 94 percent of the material will pass a 200-mesh screen. From the tube mill sump, the slurry is transferred to any of the six original correction and storage basins by a 6-in. Wilfley pump. These basins are located below the three older kilns in the kiln building. With three 6-in. and two 4-in. 40-hp. Morris transfer pumps — all equipped with ACF plug valves — slurry can be pumped into or from any of the correction and storage basins, or transferred to the two new 3,000-bbl. capacity kiln feed tanks located outside the kiln building.

These tanks are equipped with Manitowoc air agitators operating at 1 r.p.m. and are supplied with air by a Fuller C-60 compressor with a 40-hp. G-E motor. This unit is installed in a pump house at the base of the kiln feed tanks, along with a pair of 400-g.p.m. Morris pumps with 40-hp. G-E motors. The latter handle overflow from the tanks for return to the storage basins, recirculation in the kiln feed tanks, feed to the kilns, and overflow from the kiln feeders. All slurry lines in the storage and feed system are color coded for easy determination of storage-to-feed-tank, feed-tank-to-kiln, and overflow circuits.

The three older kilns and the new unit are supplied by their individual ferris wheel feeders from a common slurry line. Each of the older kilns is 9 by 8- by 219-ft. and is operated at the maximum of 75 r.p.h., with a drive from a 50-hp. motor. The new kiln—a 10- by 340-ft. Traylor—operates at the maximum of 80 r.p.h., with a drive furnished by a 125-hp. d.-c. G-E motor through a Falk speed reducer. An International U264 engine is also available as an auxiliary power unit.

All four kilns are equipped to handle either natural gas or pulverized coal as fuel. Three Raymond impact coal mills are used for the original kilns; the new kiln is supplied with coal by an automatic Raymond G-E bowl mill. These mills are used in winter months to provide coal firing during periods of interrupted gas supply, and the separate fuel feed lines are so designed that a change in hook up to the firing hood can be made from coal to gas in 30 minutes or less. To accommodate both the new and the three older coal mills, two new coal storage bins have been installed to provide an overnight supply.

Induced draft for the new kiln is provided by an 80,000 c.f.m. Buffalo Forge type SSL blower driven by a 150-hp. G-E motor. Exit gases, after passing through a dust chamber at the feed end of the kiln, are vented through the new 200-ft. Rust Engineering concrete stack. Air for clinker cooling is supplied by a size 445 New York Blower fan equipped with a 60-hp. Allis-Chalmers motor. Rated at 62,000 c.f.m., the blower has a plate-type damper between it and the cooler through which the pri-

mary air is passed for pre-heating and cooling of the clinker.

Operating temperatures of all kilns are comparable—approximately 700 deg. F. at the feed end and 2,650 to 2,700 deg. F. in the calcining zones. The new unit, however, has a 2,500-bbl. daily output, as compared to the 1,300-bbl. output of each of the older kilns. Instrumentation, particularly on the new kiln, is very nearly complete. Included are front and rear temperature gauges, r.p.m. counters, cooler draft and speed indicators, gas pressure and flow gauges, flue gas analyzers, and a Radiamatic radiation pyrometer. A separate section of the control panel for the new kiln contains instruments relative to the operation of the automatic coal mill for recording mill feed, speed, and air flow.

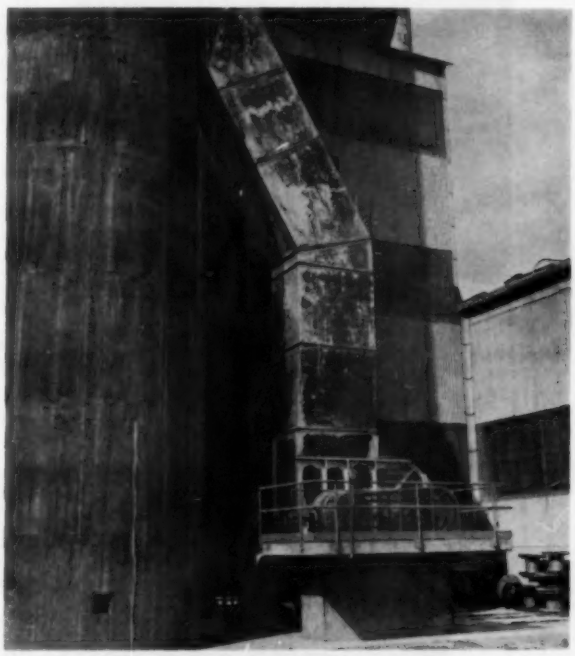
While the coolers for the older kilns are of the rotary type, the new installation, also located under the discharge end of its kiln and with flow contra to that of the kiln, is a 4-ft. 6-in. by 70-ft. Allis-Chalmers air quenching grate unit of the shaker type, for which a 15-hp. d.-c. Reliance motor supplies the drive. A Buell mechanical LR type dust collector with 70,000 c.f.m. fan draws excess air from the cooler and discharges clinker dust through a screw conveyor to the shaker conveyor, which receives clinker from all four coolers. The shaker, an F. L. Smidth Skipulter, was extended 30 ft. to accommodate the cooler for the new kiln. It transfers clinker to the boot of a bucket elevator, which in turn feeds a drag conveyor leading to the finish mill department.

One of the items in the recent expansion and revision program provided for handling clinker brought into the raw mill in any of three ways. In one method (as was done formerly) the material is fed into the feed bins for eight Bradley Griffin mills (preliminary grind ahead of the tube finish mills) by another drag conveyor. In another method, it is carried from the feed conveyor on a 24-in. by 230-ft. Barber-Greene belt conveyor out of the finish mill building to discharge onto an outside clinker storage pile (from which it is returned to the mill by a reclaiming conveyor). In the third, it is discharged directly from the main drag conveyor to the feed bin for the new finish mill.

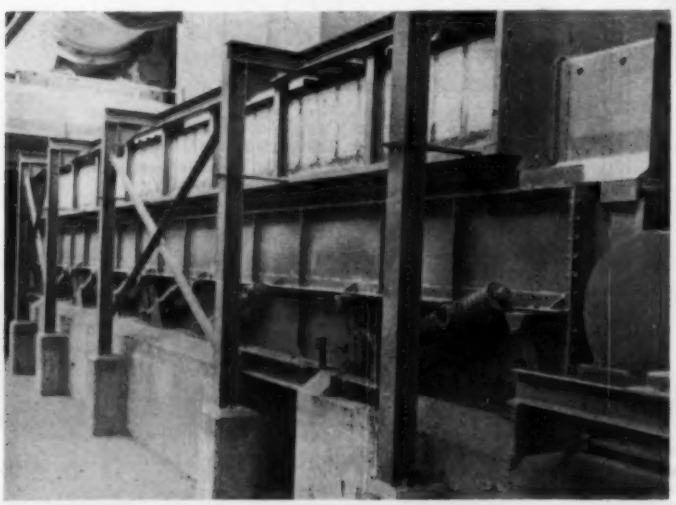
Installation of the latter has provided a complete finish milling process in one unit as opposed to the preliminary grinding required in the eight Bradley Griffin mills that feed the three older finishing mills. The new tube mill, a 10-ft. by 16-ft. 2-in. Traylor unit, is driven at 18.6 r.p.m. by an 800-hp. G-E synchronous motor. It is charged with 118,000 lb. of 3½- to 1-in. balls. The three old tube mills are 7- by 24-ft., and operate with a 70,000-lb. charge of balls up to 1 in. in diameter. Two of the tube mills have 70-bbl. per hour capacities, and the third 80 bbl., as compared with the 125-bbl. per hour output of the new mill.

Discharge from each finish mill is raised by a bucket elevator to the respective Sturtevant separator in each of the four milling circuits. However, in the circuit for the new mill, a J. D. Christian Engineering

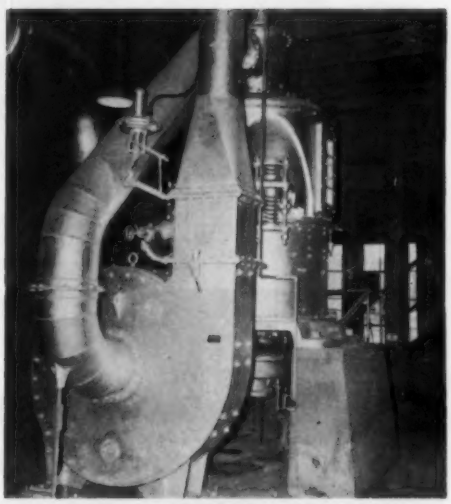
Right: Induced draft for the new kiln is provided by this 80,000 c.f.m. blower adjacent to the stack.



Below, left: A view of the new grate cooler. Units for the older kilns are of the rotary type.



Below, right: This automatic coal mill supplies the new kiln with pulverized fuel.



RAYMOND BOWL MILL Direct Firing Unit

Engineering .... GOES WITH

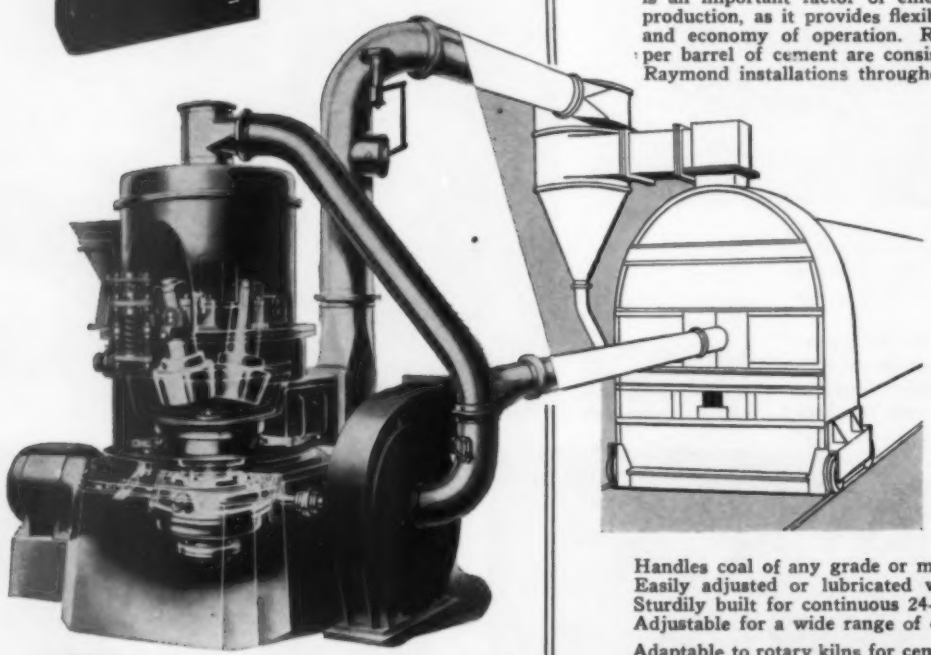
RAYMOND ENGINEERS cooperate with the ENGINEERS OF INDUSTRY

VISUAL CONTROL PANEL

Shows a continuous operating picture of the Bowl Mill . . . several mills may be handled as easily as a single unit.

Bowl Mill Firing

is an important factor of efficiency in cement production, as it provides flexible firing control and economy of operation. Record low costs per barrel of cement are consistently shown in Raymond installations throughout the industry.



Proper coal-air mixture is maintained with Bowl Mill firing for proper burning and maximum kiln efficiency.

Handles coal of any grade or moisture content. Easily adjusted or lubricated while operating. Sturdily built for continuous 24-hour operation. Adjustable for a wide range of capacity.

Adaptable to rotary kilns for cement, lime, dolomite, light weight aggregates; also for industrial furnaces.

Write for Catalog No. 75

C-E

SALES OFFICES IN PRINCIPAL CITIES

COMBUSTION

RAYMOND DIVISION

Service — RAYMOND EQUIPMENT

If you are building a new cement plant or modernizing the old one, Raymond experience can help you in developing maximum production efficiency.
Raymond engineers will work closely with you in selecting the proper size and type of equipment to meet your capacity requirements, and to insure long term economy in kiln firing and cement classification.

Whizzer Separation

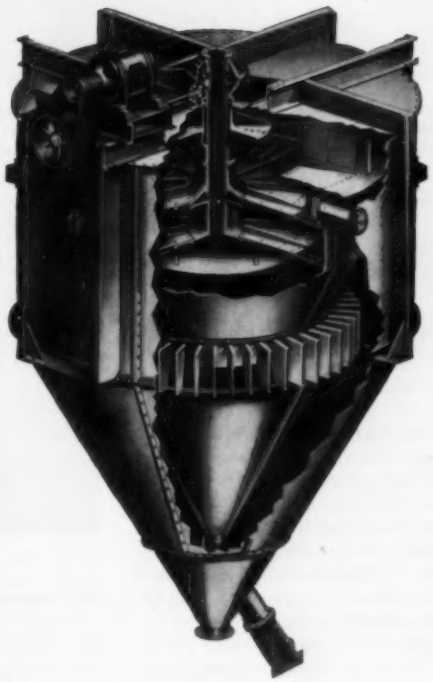
The Raymond Mechanical Air Separator with the patented revolving Whizzer provides an important link in the cement production line. With its easy fineness control and close separation of fractions, it does a precision job in the classification of raw mix or cement clinker.

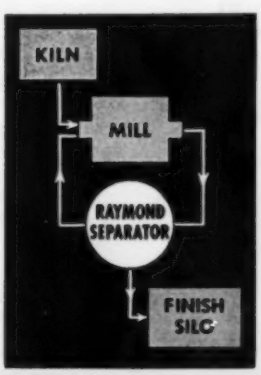
With the proper setting of the separator, the external adjustment of the slide dampers controls the fineness of specific surface area. Standard Portland grades up to high early strength cement can be produced without internal changes.

The resulting increased output, ranging from 25% up, and the improved plant efficiency due to closed circuit operation, make the Raymond Separator a "natural" for raising cement production and reducing the per-barrel cost of any grade you purchase.

For further details, see new Raymond Bulletin #76.

RAYMOND MECHANICAL AIR SEPARATOR





In closed circuit grinding operations. Raymond Separators maintain uniformity of product, boost overall mill output, and add to the efficiency of the complete unit of equipment.

SINCE 1887

ENGINEERING, INC.

1321 NORTH BRANCH STREET • CHICAGO 22, ILLINOIS
Combustion Engineering-Superheater Ltd., Montreal, Canada

A view of the new 10- by 16-ft. tube mill for finish grinding. With drive furnished by an 800-hp. synchronous motor, it operates at 18.6 r.p.m. with a 118,000-lb. charge of 3½- to 1-in. grinding balls.

The twin flights of this screw conveyor, which feeds the separator in the new milling circuit, are mounted on 8-in. pipes carrying cooling water. It is one of the first conveyors of its type in a cement plant.

water-cooled screw conveyor has been installed to transfer the milled material from the bucket elevator to the separator. This is one of the first cooling screws of its type to be placed in operation in a cement plant. This conveyor is 23 ft. long, and has twin 16-in. flights mounted on 8-in. pipes through which water is pumped as a cooling medium. Preliminary operating figures indicate that the cooling screw drops the final temperature of the cement by approximately 37 degrees F.

Coarse material is returned from each separator to its respective mill, while the finished product is transferred via screw conveyors to Fuller-Kinyon cement pumps. An 8-in. pump transfers types I, II, and III to storage silos for those materials; a 7-in. pump handles masonry cement; and the company's product known as "Incor"—a 24-hour high-early strength portland cement—is delivered to silos containing that material by a 6-in. pump. Total storage capacity of all finished products in 36 silos and interstice bins is approximately 285,000 bbl.

L. K. Schlumbrecht, left, assistant plant superintendent, and J. H. Griffith, division chief chemist.

Conventional equipment is used in the packhouse—which underwent no revision during the recent project—to accomplish bagging for truck and rail shipment and bulk loading of rail hopper cars. A new dust collection and distribution system was installed, however, over two silo groups, or warehouses, from which the packhouse is supplied. The new distribution system handling cement as delivered from the pump lines is comprised of three Fuller alleviators and three companion Link-Belt screw conveyors. Dust collection from these units and the silos which they supply is handled by three Sly 8B Dynaclones whose 4,200-c.f.m. fans are driven by 10-hp. G-E motors.

Natl. Bureau of Standards Publishes Study on Lime

Plasticity and Water Retention of Hydrated Limes for Structural Purposes (National Bureau of Standards Building Materials and Structures Report 146), is an investigation of those two characteristics of 65 structural hydrated limes from several production centers in widely separated sections of the country. The report was authored by Ernest M. Levin, Walter F. Clarke, and Lansing S. Wells.

Masonry mortars, including portland-cement mortars, in general, are difficult to work, and on actual construction projects, hydrated lime is often added to improve the plasticity and water-retaining capacity of plasters and mortars.

Studies were made to determine the relative plasticities and water retentivities of different types of commercial lime and of the relation between plasticities of lime putties and water retentivities of lime-sand mortars. These properties were considered relative to plastering and construction, and the results were related to possible specification improvement.

Copies of the report may be obtained at 15 cents each from the Government Printing Office, Washington 25, D. C.

Kaiser Aluminum Purchases Equipment for Jamaica

A cargo of heavy mining and railroad equipment was shipped recently to Kaiser Aluminum & Chemical Corporation's bauxite mining operations on Jamaica.

Included in the shipment were 35 gondola railroad cars with all-welded aluminum bodies, two 1,200-hp. Baldwin-Lima diesel-electric locomotives, and a 5-cu. yd. Marion power shovel. Other new capital equipment earmarked for the Jamaica plant includes 13 Euclid trucks (15-ton), four Caterpillar tractors, additional railroad track, and conveyor equipment.

Pennsylvania Salt Mfg. Co. Expands Mexican Operation

As an integral part of its projected five year growth program, the Pennsylvania Salt Manufacturing Company, Philadelphia, Pa., is expanding its operations in the Republic of Mexico. Nearing completion at Navojoa, Sonora, in the northwestern area is a new agricultural chemical processing plant and distribution center. This plant will provide an expansion of Pennsalt de Mexico's central plant and office facilities in Mexico City and will establish another base for the eventual distribution of the company's full line of more than 400 chemicals for use in the rapidly expanding economy of the west coast of Mexico.

Construction In Progress

On New Ideal Plant At Houston

$11,000,000 project is companion plant to present activity

By BUREN C. HEROD

Another ON THE SPOT Report

ANOTHER section of the comprehensive $55,000,000 expansion program on which the Ideal Cement Company has embarked gained momentum with the initial construction that recently got underway on new facilities for the Houston, Tex., operation. At this location, Ideal has undertaken an $11,000,000 project which is planned to more than double the present 1,300,000-bbl. annual capacity, and will produce what is actually a new companion plant for the present facility.

The existing plant — a three-kiln operation employing the wet process —was originally built by the Gulf Portland Cement Company in 1937. It was asquired by Ideal in 1940, when there was only one kiln with an annual capacity of about 300,000 bbl. In 1941 Ideal added a second kiln, which increased capacity to about 720,000 bbl.; and in 1947 a third kiln was installed, along with additional milling facilities, which brought the plant up to its present capacity.

The new plant in this project includes the following items: a new dock; a clay-soaking and storage pit and clay-handling equipment; shell storage facilities; raw and finish mills and a mill building; a kiln, a cooler, and associated equipment; clinker storage silos; and a packhouse and cement storage silos. With the exception of the dock and raw-material handling equipment, which will supply raw materials for both plants, and the packhouse, office, and laboratory, the new installation will not only be physically separate but will operate independently of the existing plant.

Work on the project was started last October with grading of the site, construction of a portion of the new plant roads, and laying of the storm sewer and other drainage lines. In March of this year, construction of the new dock and packhouse was initiated, followed by drilling of the underreamed footings for the mill and kiln buildings. Although only one kiln is being installed at present, the buildings and facilities are being erected to accommodate a two-kiln plant.

The new dock—750 ft. long for accommodation of 250-ft. incoming barges loaded with oyster shell—is being constructed of two concrete slabs, with an intervening layer of

Construction of the new dock at Houston, shown in progress here, involved driving 210 precast concrete pilings which were cast right on the property. The piles will support a "sandwich" of two concrete slabs with an intervening layer of sand.

A view of sections for the 12- by 450-ft. kiln. Progress on the new plant has been considerably expedited by having a large amount of the major equipment items on hand at the time construction was started.

An overall view of the site for the new plant, from the top of the storage silos.

Below, left: A view of construction activities, showing slip forms for the 21 new silos, which will provide a storage capacity of about 225,000 bbl.

sand. These are supported on 210 concrete pilings which were cast at the site prior to driving Shell will be unloaded from the barges by a P & H 1055LC crane with a 4-cu. yd. clamshell bucket. The shell will be transferred from the dock to the raw material storage building or directly to the raw mill feed bins on one of two belt conveyors. The raw storage building has a capacity of about 30,000 cu. yd. Shell will be supplied to the existing plant from this new shell storage building.

The mill building, which will house both the raw- and finish-mill units, and the kiln building will be of reinforced concrete and will be supported on a total of 450 underreamed footings.

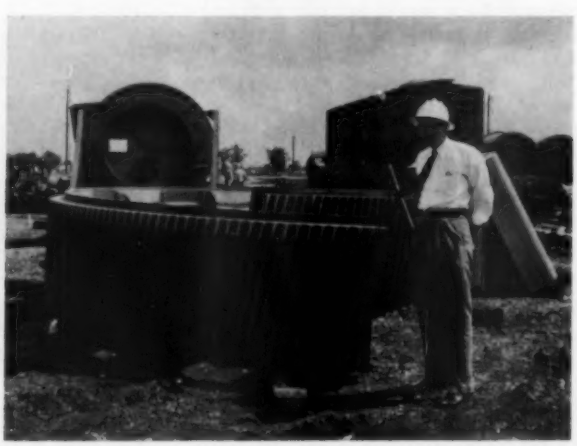
Construction of the packhouse and 21 cement storage silos (plus 12 interstice bins) is nearest completion and will provide a cement storage capacity of approximately 225,000 bbl. A dual track scale system will provide for handling both boxcar and hopper car shipments of bulk cement.

Considerable attention has naturally been paid to co-ordination of the various phases of the program as construction progresses. Toward that end, much of the new equipment has already been received and, in most cases, has been laid adjacent to the locations where the units will ultimately be installed.

Major components awaiting installation include a 12- by 450-ft. kiln, a 6- by 100-ft. grate type cooler (both products of Allis-Chalmers) and their drive equipment. Other equipment to be incorporated include Buell dust collectors of both

(*Continued on page* 146)

J. L. Conerly, plant manager, standing by a gear segment for one of the two 11- by 32-ft. mills that will handle raw and finish grinding.



Profitable trends in the use of refractories

Cement plant expansion aided by Laclede's 'one-package' refractory service

To help you meet expanding cement and lime needs, make profitable use of Laclede-Christy's 'one-package' service. This service does more than satisfy your refractory requirements. Certainly you obtain highest quality fire clay refractories—alumina liners (40% to 70%), castables, plastic and all special and standard refractories—for rotary kilns, hoods, clinker coolers, and other uses.

You may also obtain extra Laclede service. Laclede ceramic engineers, modern research facilities and technically trained personnel are on hand to help you solve special problems.

Laclede-Christy's nearby stock locations mean prompt delivery—of one or several types of refractories.

Next time you need refractories, call your Laclede man. Or, contact headquarters to help satisfy your specific needs.

Laclede-Christy Refractories for the Cement and Lime Industry

Laclede 70 (70% Alumina) — particularly suited for hot zone liners in cement, lime, dolomite and magnesite kilns.

Laclede Peerlac (60% Alumina) — for kiln areas requiring lining materials of higher refractory value than high duty and super duty fire clay brick.

Laclede Kiln Liners for all intermediate and cold zone applications.

Laclede Plastic Refractories for hoods and stationary clinker cooler arches.

Laclede Castable Refractories for kiln hoods.

Suspended Arches for stationary clinker coolers.

LACLEDE-CHRISTY COMPANY DIVISION

H. K. PORTER COMPANY, INC.

2000 Hampton Avenue · St. Louis 10, Missouri

ROTEX
SCREENERS
IN CEMENT MILLS

The Marquette Cement Manufacturing Company is using a number of ROTEX Screeners for the final scalping of cement before packing. The accompanying illustrations show two such installations at this Company's Nashville, Tennessee, plant.

The ROTEX has been chosen for this work because its highly effective screening action makes it possible to use a small, compact machine that is easily installed and requires little attention while handling large capacities.

The totally enclosed construction, that is comparatively dust tight, greatly improves operating conditions and makes housekeeping simple.

The traditional rugged construction of ROTEX makes possible the maximum number of operating hours with a minimum of shut down time and maintenance costs.

The fact that this Company is continuing to install ROTEX in pack houses at other mills demonstrates that ROTEX Screeners have completely proven their worth.

Send for information covering ROTEX Screeners for your mill.

The illustration above shows two ROTEX Screeners No. 21, with a single screen surface 30 by 60 inches, each of which is screening 500 barrels of cement per hour on a three eighths inch wide elongated opening steel wire screen.

The 40 by 84 inch single screen surface ROTEX Screener No. 41, pictured at the right, is scalping 1000 barrels of cement per hour on the same steel wire as described above.

THE ORVILLE SIMPSON COMPANY

1230 KNOWLTON ST.,
CINCINNATI 23, OHIO

From the size of a Piano to 3" in ONE PASS!

with this Big 53" x 60"
DOUBLE IMPELLER IMPACT BREAKER

The Cedarapids Double Impeller Impact Breaker's reduction ratio of *40 or 50 to 1* is one of the many features which help cement producers step up output and cut production costs for crushing limestone or shale. By reducing 53" diameter material to 3 inches *in one pass*, you eliminate the need for much accessory equipment like secondary crushers, screens, conveyors, etc. Maintenance and operating costs are low. The entire breaking chamber is utilized for breaking rock against rock, so there is approximately 50% less contact of stone against metal. Wear on hammers and breaker bars is reduced and horsepower requirements are cut. For the complete Double Impeller story, see your nearest Cedarapids distributor or write for Bulletin CC-3.

Cedarapids — Built by IOWA

SERVES THE CEMENT INDUSTRY WITH THE FINEST LINE OF CRUSHING AND SCREENING EQUIPMENT

HAMMERMILLS

produce a much finer quality of material, and size for size, turn out more tons per hour than other similar types of equipment.

HORIZONTAL VIBRATING SCREENS

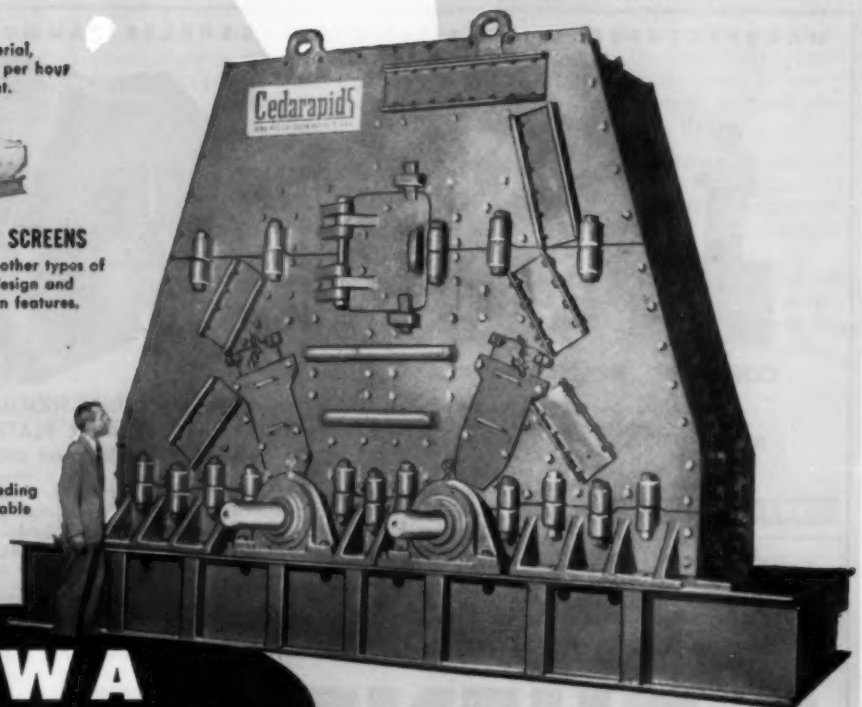
20% to 30% more capacity than other types of screens results from *horizontal* design and other exclusive Cedarapids screen features.

HEAVY-DUTY FEEDERS

Designed for heavy-duty service in feeding big crushers to assure a smooth, workable flow of material, and withstand the shock of heavy dumping.

★ The big Model 5360S, owned by Huron Portland Cement Co. of Detroit, is reducing extremely hard shale to 3" at a rate of 300 tons per hour, with practically no maintenance! This company is also using a Cedarapids 50" x 14'6" heavy-duty cast manganese feeder.

★ A Kansas limestone producer is turning out 800 tons per hour with a Model 5360H, and states he could handle greater quantity if desired! This plant also includes a Cedarapids Model CMF heavy-duty feeder, 14 horizontal vibrating screens and two 4024 roll crushers.



IOWA MANUFACTURING CO.
Cedar Rapids, Iowa
U.S.A.

WHY BE SATISFIED

with an Ordinary Bag Design?

Especially when an *Extraordinary** bag design can make your product stand out today, and be remembered in more competitive times.

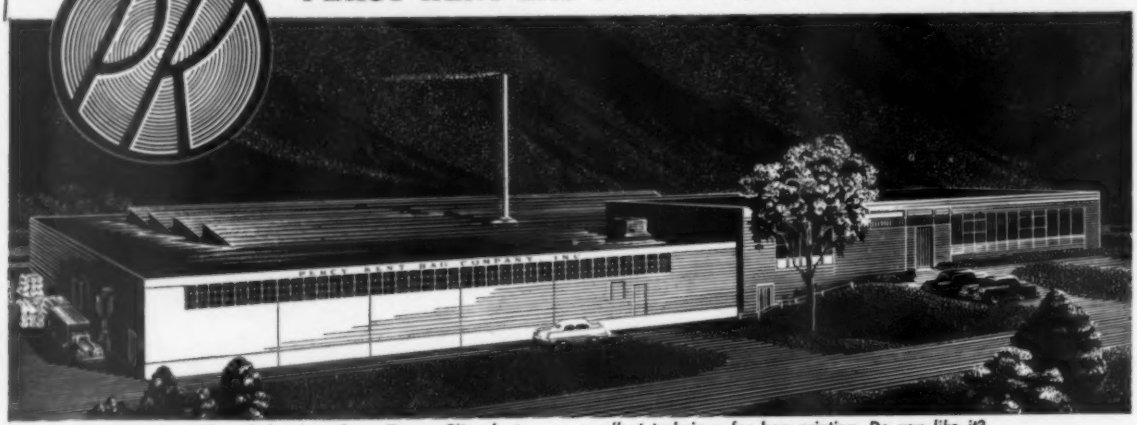
**The kind we set as our standard at Percy Kent.*

SINCE 1885

MULTIWALLS • COTTONS • BURLAPS

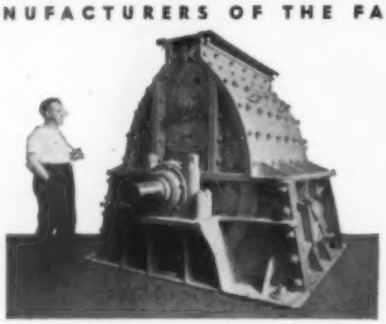
PERCY KENT BAG COMPANY, INC.

KANSAS CITY • MINNEAPOLIS • OKLAHOMA CITY
CHICAGO • BUFFALO • NEW YORK



Scratchboard drawing of our Kansas City plant . . . an excellent technique for bag printing. Do you like it?

MANUFACTURERS OF THE FAMOUS GRUENDLER HAMMERMILL SINCE 1885



CENTER-FEED IMPACTOR CRUSHER

GRUENDLER SWING-HAMMER CRUSHER with TRAVELING BREAKER PLATE—the only satisfactory method in handling wet sticky Rock, Ores, Shale.

Increase your Ball and Roller Mill capacity as much as 50%

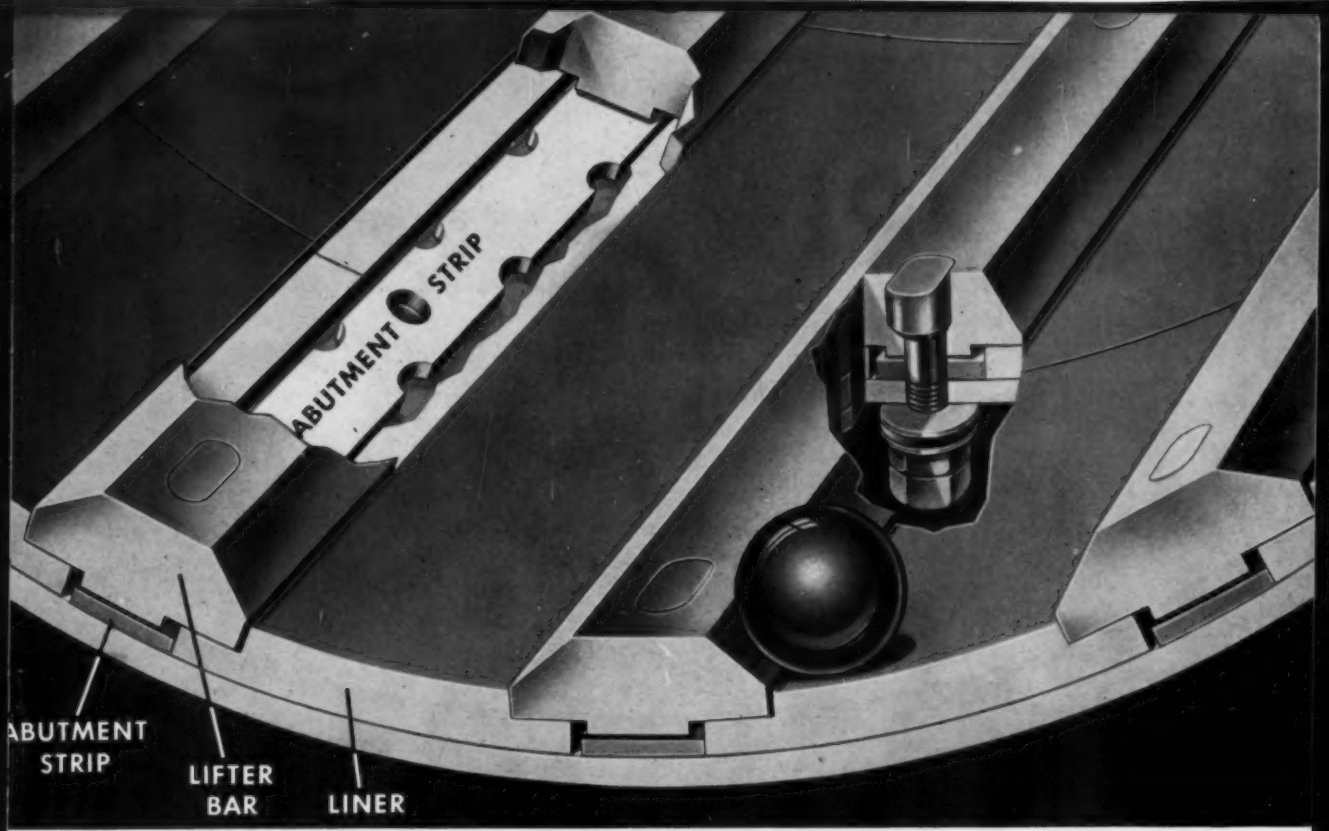
Units will be specially adapted to your particular problem. Available with rear cleaning belts, non clogging discharge feed control interlocks. The infrequent maintenance cycles can be adjusted or an arranged program to fit your production schedules. The reversibilities of the Center Feed Crusher permits optimum use of the abrasion resistant liners in the crusher chamber. An unusually wide range of operating speeds, one of the several effective adjustments to obtain product size with minimum circulating load.

DO YOU HAVE A PROBLEM ABOUT CRUSHING?
Write us without obligation. BULLETINS also on request.

GRUENDLER

ROLL CRUSHERS — JAW CRUSHERS — SCREENS also available.

GRUENDLER CRUSHER & PULVERIZER CO.
2915-17 North Market
St. Louis 6, Mo.



New liner saves cement mill wear

Here's KENSINGTON's latest triumph in its *War Against Wear* . . . the new ORO-LOK Lining for cement grinding mills.

By combining superior, wear-resisting materials and improved design, this revolutionary new lining successfully overcomes the most common causes of wear, breakage, and excessive maintenance.

Briefly, here are just a few of the important improvements:

Patented, welded-on abutment strip reinforces shell at location of bolt holes.

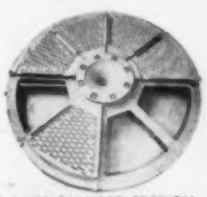
Bolts seldom loosen. In conventional linings, shocks and blows set up a shearing stress which causes bolts to loosen and break, thus requiring frequent, regular, and costly servicing. As seen above, ORO-LOK design *completely eliminates* this common cause of trouble because liner plates butt against abutment strips which absorb all lateral stress. Bolts are subject to tension only.

OROLOY lifter bars outlast others. OROLOY is a special super-hard, super-tough alloyed high-manganese steel. Not only is it hard to begin with, but it *actually fights back against wear* by developing even greater surface hardness when subjected to impact of balls. You can expect OROLOY Lifter Bars to last as long as the liner itself . . . and when necessary, they can be easily renewed or reversed without disturbing rest of the lining.

Needs no grouting-in. Since not enough abrasive material can enter behind plates to cause serious scouring, there's no need for zincing or grouting-in.

For more information on the new ORO-LOK Lining and how much it can save *you*, phone or mail coupon today. You'll be under no obligation.

Other wear-resisting KENSINGTON replacement parts:



DIVISION HEAD SECTION
for grinding mill has exclusive design features which greatly prolong service life.

SCREENS, GRATES, LINERS
and other alloyed manganese steel replacement parts fit all standard cement mills.

CHAINS, SPROCKETS
150 different standard chains and sprockets plus many special models . . . all of wear-defying KENKROME.

KENKROME ELEVATOR BUCKETS
for outlast ordinary fabricated buckets wherever abrasion and impact are important factors.

Kensington STEEL COMPANY

KENSINGTON STEEL CO., Dept. P, 505 Kensington Ave., Chicago 28, Ill.
SUBSIDIARY OF POOR & CO., CHICAGO

☐ Please send more information on ORO-LOK Lining.
☐ Please quote prices.

Description of mill: Make_____

Model_____ Present Liner Thickness_____

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

AIRALON

for Low-Cost Air Entrainment

Where cost control is to be stressed in air entrainment of masonry cement, experience dictates Airalon. This convenient compound has a uniform ratio of saponified resin acids and fatty acids for consistent air entrainment, plasticity and water retention. Now shipped in non-dusting, moisture-resistant "chip" form, packaged in new, protective polyethylene-lined bags.

CEMENT MILL

MAKING RESEARCH PAY OFF FOR YOU

It's not by chance that Dewey and Almy cement mill products set the additions standard for quality and performance. Each product had its beginning in the world's finest privately-owned cement and concrete laboratories.

Since 1932 these laboratories have been the scene of untiring research. Here are probed many aspects of the chemistry of cement and concrete. Here it is possible to duplicate nearly every conceivable cement mill or construction situation. Thus, the research is *utterly practical.*

Our products—Airalon, TDA, MTDA and MRDA among them —are presented to the trade by field men whose knowledge and technical skill are among the best in the industry.

Cement mill production men rely on these products for uniform quality and for performance that matches specifications. Contractors and builders also value these products in their cement usage . . . further proof that research that begins in the laboratories pays off *on the job.*

DEWEY AND ALMY
CHEMICAL COMPANY
DIVISION OF W. R. GRACE & CO.

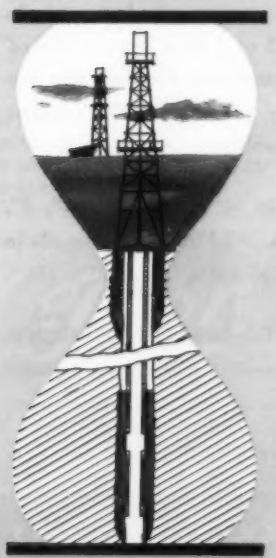
CAMBRIDGE 40, MASS. • MONTREAL 32, CANADA CHICAGO 38, ILL. • SAN LEANDRO, CALIF.

TDA AND MTDA FOR

Increased Finish Grinding Mill Output

These widely-used, reliable, clinker grinding aids are used in finish grinding of portland cement. (80% of all mills producing portland blast-furnace slag cements employ TDA or MTDA.) With them, mill output increases 10—50%. They contain catalysts which speed hydration of cement. TDA is highly effective in the grinding of High Early Strength cements and is ASTM approved.

STANDBYS



MRDA

for Uniform Pumping Time

Specially compounded retarder for slow-setting oil well cement, MRDA contains carefully selected ingredients. These ingredients—plus the watchdog action of our unique infra-red spectrophotometer—give essential assurance of the desired uniform retardation.

"They just keep "ROLLIN' AROUND"→

NI-HARD

GRINDING BALLS give "extra service" in the Cement Industry

Above—Ni-Hard balls being packed in drums for shipment to cement plants from The Pennebacker Company.

Right—Pennebacker 1" diameter Ni-Hard balls sectioned to show soundness.

A giant in size and range, the cement industry is highly competitive. Any item staying on the "required material" list has *earned* the job via the cost sheets.

Many successful cement producers use NI-HARD balls in their grinding mills because of *proved* economies. Made of extremely abrasion-resistant metal, these balls have a superiority of up to 3 to 1 ratio over hardened steel in dry grinding raw stone and clinker. For wet grinding cement stone, they have given 50% longer service life than hardened steel.

We stock NI-HARD balls in ½", ⅝", ¾", ⅞", 1", 1¼", 1½", and 2" diameters. NI-HARD slugs made in sizes ⅝" diam. x 1" long, ⅞" x 1¼", and 1" x 1¼".

All standard sizes promptly shipped. Consult PENNEBACKER for special orders—if you have an unusual grinding problem, we can furnish valuable suggestions.

We have been Producing NI-HARD GRINDING BALLS SINCE 1946

Write today for full details. →

THE PENNEBACKER COMPANY
Emmaus, Pennsylvania
Authorized Producer of Ni-Hard

*"Reg. U.S. Pat. Off., The International Nickel Co., Inc.

New Thor all-purpose one-man drilling machine

THOR introduces the powerful new 390 drilling machine with a host of features which speed up drilling operations and reduce operator fatigue.

This Thor drill is equipped with heavy-duty aluminum cylinder and chrome-plated steel piston rod and a specially designed 45 lb. sinker rock drill with integral feed leg connection. It can be easily converted for sinking. Thor 390 is equipped with a line oiler and automatic water valve which can be replaced with a plug for dry operation or collaring.

All controls are grouped on the backhead for safe convenient operation. A six position throttle, a Thor exclusive, gives a complete range of control from complete shut-off of air and water, to full air and water supply in logical steps for easy convenience and instant control.

Optional feed travel legs available in 36", 48" and the new model 680 72" telescopic leg.

Your nearest Thor representative will be glad to arrange for a demonstration. Thor Power Tool Co., Aurora, Ill.

MODEL 390
DRILLING MACHINE
MOUNTED ON 72"
680 TELESCOPIC LEG

Thor
PORTABLE POWER
TOOLS

New Thor 390—drifter, sinker, stoper—all in one

The Thor No. 390 is easily adaptable for all types of drilling at all angles. The drill can be removed from the leg for use as a sinker by loosening only one nut. Tool swivels into vertical position for stoping.

THOR POWER TOOL COMPANY

Atlanta	Chicago	Detroit	Newark	St. Louis	Export Division,
Birmingham	Cincinnati	Houston	Long Island City, N.Y.	San Francisco	New York City
Boston	Cleveland	Los Angeles	Philadelphia	Seattle	
Buffalo	Denver	Milwaukee	Pittsburgh	Toronto, Canada	

Rational Approaches

(*From page* 74)

creased to the particle size obtained when the residue of the fines reaches the same value as the amount of coarse passing, for example, 25 percent residue of fines, also 25 percent passing of coarse. If the circulating load is calcultaed by means of this particle limit of the fines, a 1,000-fold circulation is found for the 1- to 10-micron fraction. The 1-micron particle is circulated 5,000 times through the circuit before it is seized by the air separator. For the finest cement (ground to 4,500 Blaine) the tailings will still contain 90 percent fines, and the finest grains are circulated 28,700 times through the air separator before they are caught.

Spray-separators, not flow-separators, are necessary for these purposes, and these at present are manufactured by only two firms in Germany. Closed-circuit grinding has become a question of air separators. It is no longer the feed-rate but the air separator which is regulated to provide a steady straight-line particle curve with the desired Blaine figure, so that the finenesses and strengths show no fluctuations.

The length of a closed-circuited mill is important for correct design; also, the diameter should not be less than 9 ft. The ratio between inside length and inside diameter $\left(\frac{L}{d}\right)$, based on present experience, should be at least 2.25, to provide the air separator with sufficient fines. The ratio must even be 4.5 for fine and extra fine cement. As the mill length is proportional with the throughput, the extra advantage of higher production is also obtained. For small (120-bbl.) mills the ratio 2.25 should be chosen, and 4.5 only for larger mills. The ratio is approximately 5.4 for compartment mills.

The foregoing thoughts are merely a review of kiln and mill problems which will require thorough study. It would be gratifying if young technicians and engineers in cement plants would take these problems up and if the individual questions could be brought closer to their solution through a broader exchange of experiences; in time, then, we shall be able to improve and refine our understanding of the technique of burning and grinding.

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Construction at Houston

(*From page* 136)

the cyclone and electric precipitator type for the cooler and kiln, respectively; a Sauerman drag scraper for the clay-soaking pit; twin 16-ft. Sturtevant separators for the large new 11- by 32-ft. finish mill; Dorr mechanical and air agitators for the new slurry tanks; and an Allis-Chalmers 6- by 60-ft. dryer for handling shell to be used in making masonry cement.

In addition to the structures already under construction, erection will start soon on three 9,000-bbl. kiln feed tanks and eight 12,000-bbl clinker storage tanks, all of reinforced concrete.

One unusual feature in the plant design is that of air-conditioned central control room, to be located in the kiln building. Not only will the controls cover every phase of the operation from shell storage to finished cement but plans also call for the installation of a closed-circuit television which will give the operator a view of the kiln burning zone.

Design and engineering details are being worked out by Ideal's engineering staff, and the construction is being handled by contractors. Upon completion, the new kiln is expected to produce about 4,200-bbl. of clinker daily, as compared with approximately 3,600 bbl. from the kilns in the present plant.

Plant operations are under the general supervision of Harley Fleming, southern regional production manager J. L. Conerly, plant manager, and Frank Chambless, assistant plant manager.

Why this feeder doesn't cave in

● The reason is simply this: *The* PIONEER-ORO *Feeder is the most rugged feeder ever built.*

Take a look at its massive pans . . . cast from a special wear-resistant manganese steel, heavily ribbed, reinforced, and all the way from 3/16" to 1" thick, depending on width of feeder. The pans are supported by heavy, closely-spaced manganese steel rollers, keyed 3 to a heavy diameter shaft. Each shaft turns in 3 heavy-duty bearings rigidly supported on the feeder frame.

Takes heaviest dump loads

The PIONEER-ORO is designed for the roughest, toughest feeding jobs on earth. It withstands the impact of the heaviest dump loads. It shrugs off abrasion from hard ores, slag, flintrock, granite, and other coarse, heavy materials.

But the mighty PIONEER-ORO offers more than sheer, brute strength. It is a smooth-running, finely engineered unit designed to deliver a constant flow of heavy, abrasive material, with a minimum of maintenance. Even preventive maintenance costs are low.

Rivetless pans overlap and interlock

Pans, for example, overlap and interlock to provide added stability and stop leakage and spilling. Upturned end flanges also reduce loss of material. Drive links are cast as an integral part of the pan, so there are *no bolts or rivets that can loosen.* Easily replaced link bushings need no lubrication.

Sprocket teeth are readily reversed or replaced without taking the sprocket hub from the shaft or even disconnecting the pans. Like all other wearing parts, these teeth are cast from special wear-resistant manganese alloyed steel.

Supporting rollers and shafts can be removed, too, without disturbing the pans.

OTHER FEATURES

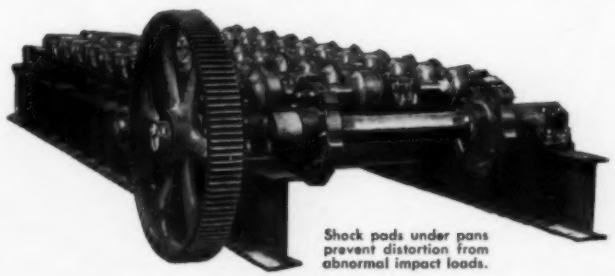
1. Patented lugs in pan links remove dirt, make links self-cleaning.
2. Feeder can be made to run in either forward or reverse direction.
3. Available in standard widths up to 84", widths in excess of 84" by special order, and lengths as required.
4. Made with 6", 9", 12" or 15" pan pitch (depending on width) to fit available head room.

PIONEER-ORO FEEDER
Capacities in tons per hour

Travel per Min.	Width of feeder						
	30"	36"	42"	48"	60"	72"	84"
10'	74	108	147	192	300	432	588
15'	112	162	222	289	450	648	888
20'	148	216	294	384	600	864	1176
25'	186	270	368	482	750	1080	1472
30'	223	324	442	577	900	1296	1768

Ask Your Feeder Salesman These Questions

1. Are pans made from special manganese steel? How thick?
2. Are pans and links cast together so they are rivetless?
3. Can manganese parts be replaced without disassembling pans?
4. Are rollers keyed to shafts which turn in heavy bearings?



Shock pads under pans prevent distortion from abnormal impact loads.

Note the turned-up end flanges and corrugated surface of heavy-interlocked pans; also absence of rivets.

For further details and specifications regarding full line of PIONEER *Feeders, write Pioneer Engineering Works, Inc., Minneapolis 13, Minn. (subsidiary of Poor & Company, Chicago) or see your nearest* PIONEER *Distributor.*

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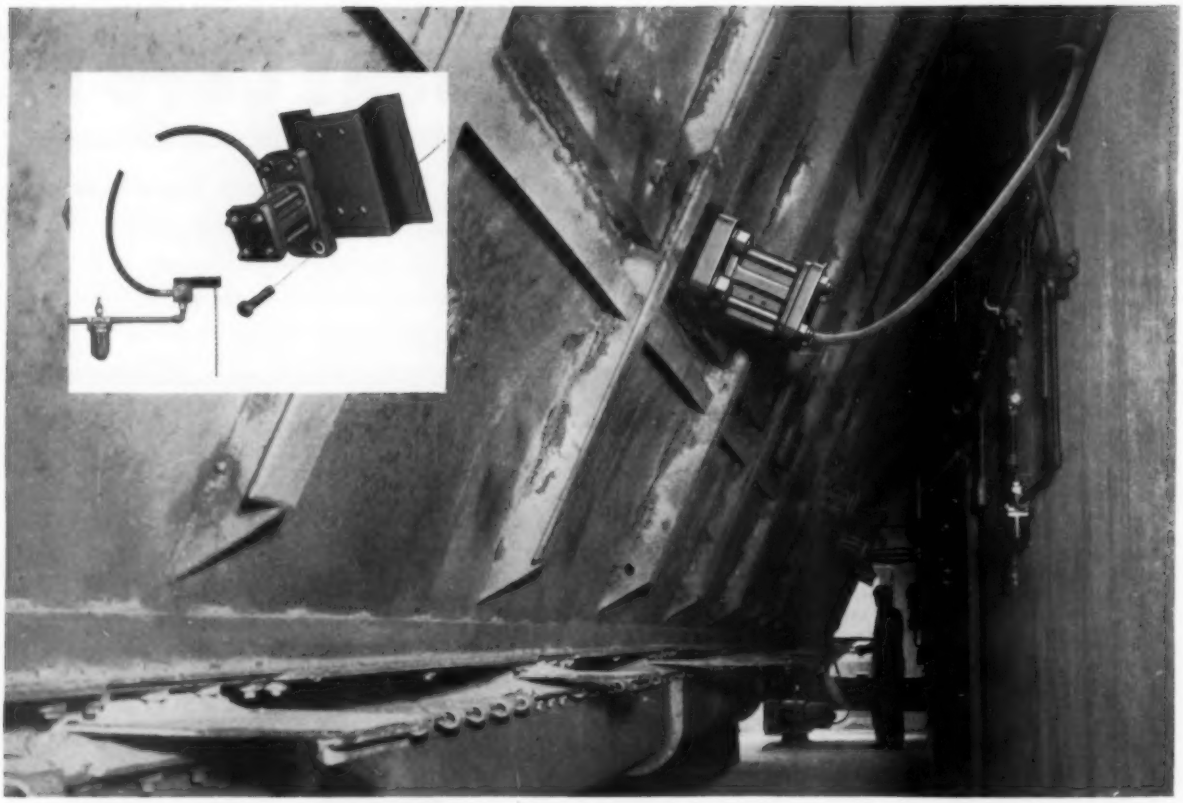

This precipitator at the Security, Md. plant of North American Cement Company uses type F Cleveland Air Vibrators. The long, powerful stroke of these F's is ideal for this application, spreading vibration through the walls of the precipitator without affecting the rest of the structure.
Inset: This is a typical kit that is supplied by Cleveland Vibrator for easy bin installation of vibrators.

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Cleveland Vibrators keep this electric precipitator at peak production for North American Cement Company. These heavy hitting, long stroke air vibrators are remotely controlled for intermittent operation. Cement hanging on rods or sides is efficiently knocked down to the screw conveyor. Dust is no problem. These vibrators are sealed and automatically lubricated.

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Flame Control In Rotary Kilns

By W. R. DERSNAH
Manufacturing Process Engineer
Portland Cement Association
Chicago

IN many industrial plants the machinery is so large that the human operator is almost overshadowed or dwarfed by its size. When this machinery is composed of immense moving parts, it is often difficult to visualize how its product may be controlled to any degree of accuracy. Most persons can understand the arrangements of gears and motors by which motion is imparted to the machinery and the rheostats or multiple speed motors by which the speed is changed. However, it is sometimes less obvious how an operator may control a large-volume chemical process to produce a material which will satisfy rather rigid standards.

The burning operation in a cement plant is a large-volume, chemical process in which large moving equipment is involved. To the uninitiated visitor it would seem a tremendous operation, although not so glamorous or spectacular, perhaps, as the tapping of a blast furnace in a steel mill because the 2,800-deg. F. flame is enclosed in the huge rotating cylinder called the kiln. The discharge from the kiln, because of its continuous nature and its usual relative obscurity, may appear relatively small. When one considers that in an hour this clinker discharge may amount to 25 to 30 tons of a carefully controlled chemical product, the importance of the burner and his control become more apparent.

Throughout the plant each of the 200 or more employees exerts a modest or a great amount of control over the quality or volume of the finished product. The chemist and his staff control quality through tests, from the quarry to the silos. The millers exert control over both quality and volume by operating to achieve the proper finenesses without sacrificing production. Maintenance men and service men all help to keep the operation running continuously, an important part in maintaining a chemical process. Other workers too numerous to mention have their part in the operation.

Nowhere in the plant, however, does any one individual have as great an opportunity to control both quality and volume as does the burner. His almost unlimited opportunity for control through adjustments of fuel, air, draft, and operating speed place him in an enviable position. Here in the burning department the mountains of raw materials and fuels are converted and consumed in some of the largest pieces of moving machinery in any industry into one of the most important of building materials. As the raw materials pass through the kiln, they also pass through two distinct chemical changes, endothermic in the calcining zone and exothermic in the clinkering zone. Through visual observation of the clinkering process and with the aid of various meters and recorders, the burner makes those adjustments required to maintain production of a quality product.

This article is concerned with the various means of control available to operators in widely scattered plants and the use which is made of these controls. It covers a study of flame characteristics and flame control in 14 plants selected to cover wet and dry processes, and various types of fuel and coolers. The information was obtained during plant visits through observation and from interviews with operators. This discussion includes the methods used for controlling the burning process and pertinent factors such as (1) design of burner pipes; (2) flame characteristics—length, velocity, position, and type; (3) percentages and temperatures of primary and secondary air; (4) use of excess air; and (5) ring formation and kiln coatings. (This information also appears in tabulated form near the end of this article.)

There has been a considerable reduction in the fuel requirements for burning a given amount of clinker in rotary kilns since they were first used in the manufacture of portland cement. The solid fuel requirement has dropped from 40 per cent, by weight of clinker produced, to approximately 25 percent during this interim. A casual observation might lead one to believe that this was outstanding progress until he stops to consider the theoretical fuel requirement per barrel of clinker. The facts show that there is much room for improvement, since the average coal consumption in a dry-process kiln (100 lb. of coal per barrel of

(Continued on page 154)

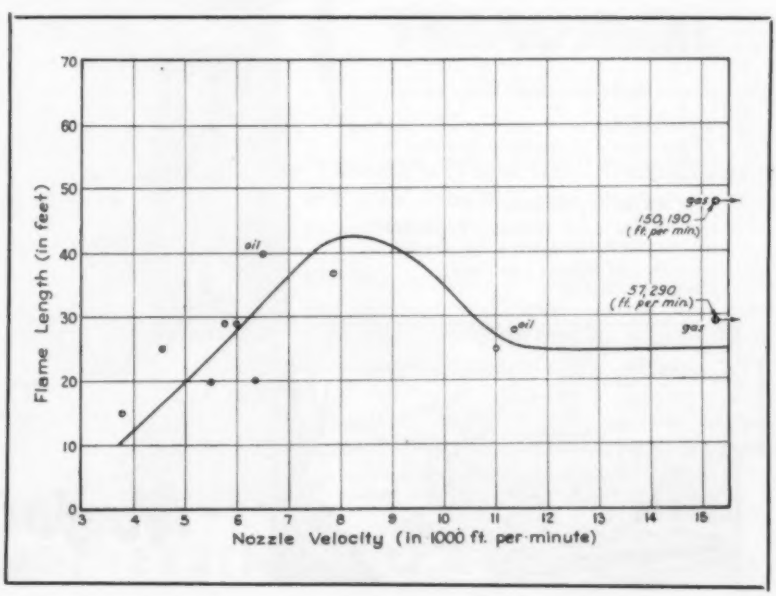

Fig. 1. Relationship of nozzle velocities to flame lengths.

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Typical analyses are shown below, but our specialists will be glad to consult with you regarding your specific needs. If you need limestone or limestone products, there's no doubt about it — the best location for your plant is in the *Land of Plenty*.

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Undesirable magnesium carbonate secreted by fossil algae

Phosphorous, a very undesirable substance in limestone

Silica, occurring here in a module of flint, commonest of objectionable impurities in limestone

Vein of pure calcium carbonate. Too many such veins cause limestone to crumble when fired in dry kiln.

Stylolites . . zig-zag films of common impurities such as iron, sulphur, magnesia, etc.

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This is the premium-grade limestone which is waiting for you in *The Land of Plenty*. This limestone, in deposits aggregating more than 100 million tons, is almost 100% *pure*. It is the best grade for chemical lime, calcium carbide, open-hearth steel-making and other important purposes. See the analyses below:

And here are typical analyses *

	DNL-1-1	DNL-1-2	DNL-1-3
SILICA (SiO_2)	.36%	.30%	.34%
IRON OXIDE (Fe_2O_3)	.072	.043	.049
ALUMINA (Al_2O_3)	.21	.20	.19
LIME (CaO)	55.00	54.90	55.40
MAGNESIA (MgO)	.65	.62	.51
SULPHUR (S)	.012	.011	.015
PHOSPHORUS (P)	.006	.006	.009
IGNITION LOSS	43.20	43.50	43.20
CALCIUM CARBONATE (Calculated)	97.90	97.72	98.51
MAGNESIUM CARBONATE (Calculated)	1.36	1.30	1.07

*Report prepared by Pittsburgh Testing Laboratories, Pittsburgh, Pa.

For complete information, furnished in confidence and without obligation, write, wire or call:

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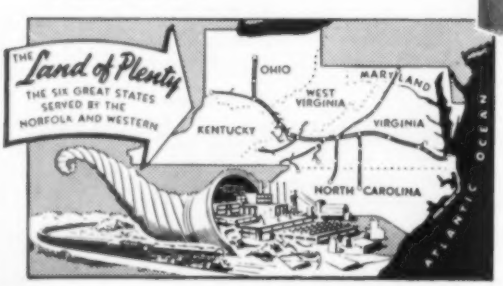

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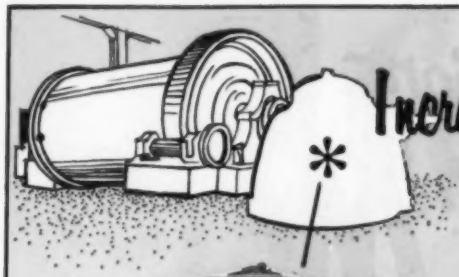

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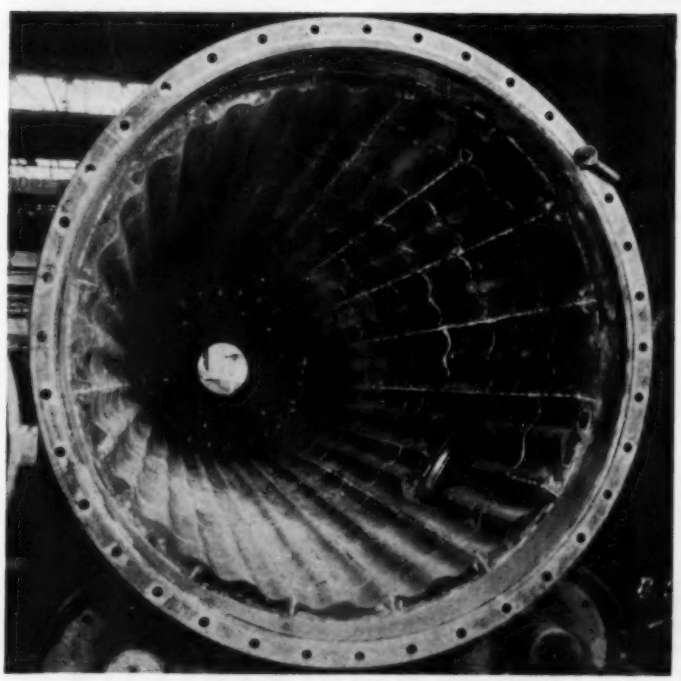

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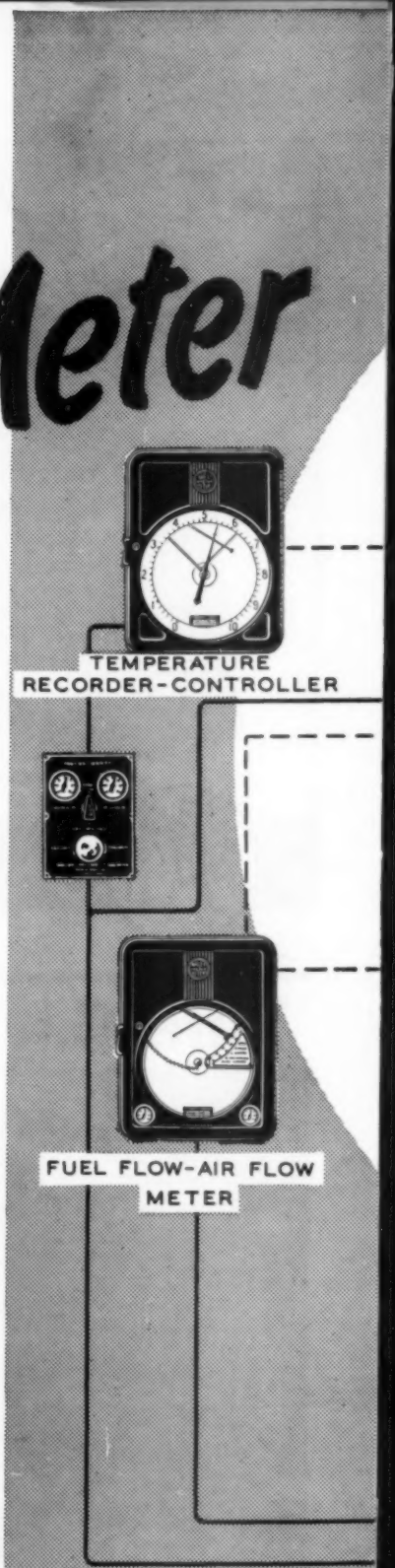
2. **Uniform High Quality of Product**—Accurate measurement and control of Kiln Speed, Burning Zone Temperature, Combustibles Content and Oxygen Content . . . *for a high grade product, consistently.*

3. **Minimum Maintenance**—Uniform excess air conditions and constant temperatures *prolong the life of your kiln.* Costly refractory repairs and wear and tear on auxiliary equipment are reduced to a minimum.

The accompanying diagram shows one way in which Bailey instruments and controls can give you a "Self-Serve" Kiln. Other arrangements to suit the requirements of any rotary kiln are available.

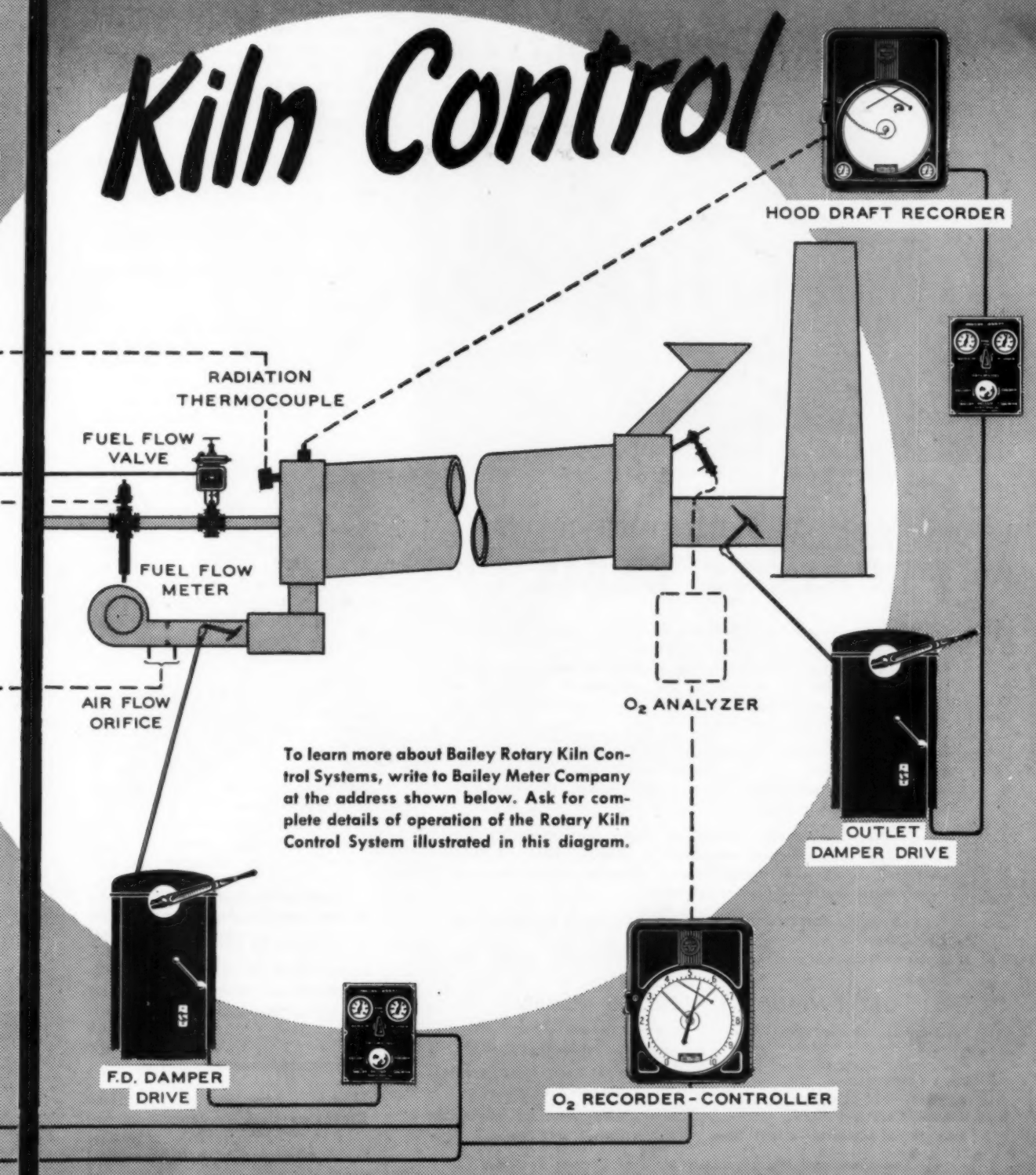
Bailey Meter Company maintains a staff of engineers who are experts in the control of rotary kilns. Let one of these men help plan a control system to give you a "Self-Serve" rotary kiln.

P-23



Bailey Meter Company

Kiln Control



To learn more about Bailey Rotary Kiln Control Systems, write to Bailey Meter Company at the address shown below. Ask for complete details of operation of the Rotary Kiln Control System illustrated in this diagram.

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PRIMARY GRINDING MILLS' VENTILATION—1 Automatic-Continuous Filter.

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OFFICES IN PRINCIPAL CITIES

(*Continued from page* 149)

clinker) is five times the theoretical requirement of about 20 lb. of coal per barrel of clinker.

There are four main areas of heat consumption, which have been estimated to be in the following percentages:

22%	used effectively in chemical reactions
55%	waste heat at about 1500 deg. F.
10%	radiation and convection losses
13%	lost in the clinker discharge
100%	

It has been estimated that 48 percent of the effective heat is used for drying and pre-heating the raw mix and 52 percent is used for decomposing carbonates and clinkering.

One well known improvement, waste heat boilers, saves an estimated 40 percent of fuel. Other improvements which have been tried with more or less success are as follows: (1) slurry lifters, which were found to work better on dry products such as clinker or coal; (2) slurry sprays, which have been found to cause considerable amounts of dust; (3) slurry filters; (4) chain systems; (5) heat recuperators; (6) the Lepol kiln; (7) sinter grates; (8) pre-heaters; (9) calcinators; and (10) clinker coolers.

In addition to various types of equipment which are installed to increase fuel economy, there are many other factors which influence fuel consumption and efficiency of kiln operation. One of these factors has been designated as "flame control". This report is concerned with a study of certain aspects of flame control and its influence on fuel economy and kiln operations.

Plants were selected for this study to cover combinations of wet and dry processes with three types of fuel (coal, gas, and oil), as well as different types of clinker coolers, although these were not necessarily the only important factors considered in flame control. The following discussion presents an analysis of the information obtained.

Flame Direction Direction of the flame was considered from two viewpoints: (1) turning the burner pipe to the load side as contrasted to having it centered; and (2) tilting the burner pipe up or down, as contrasted to aiming it parallel with the kiln. Of the 14 kilns studied, 6 were operated with the fuel pipe aimed equidistant from the sides, while 8 fuel pipes were turned towards the load side of the kiln. In

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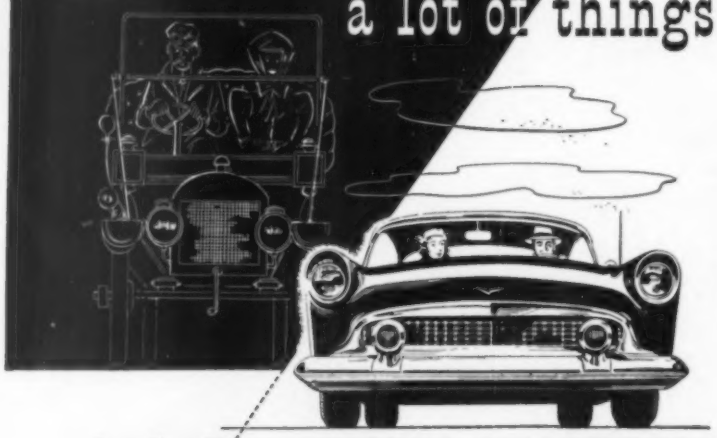

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11 kilns the pipe was tilted down or parallel to the floor of the burner's platform to give the effect of a downward tilt, while 3 had an upward slope equal to the slope of the kiln.

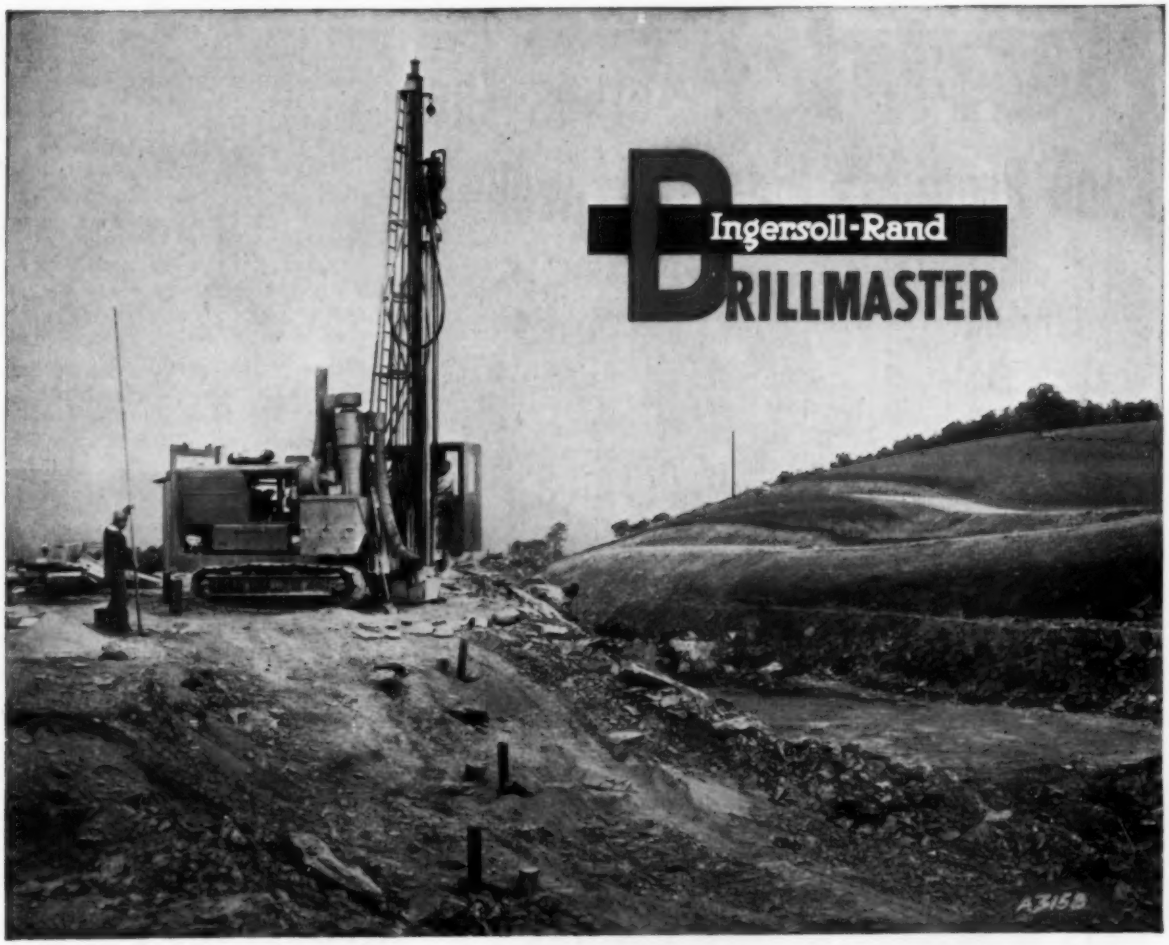
An important factor in positioning the flame to the side is the thickness of the load, which is dependent on the length of the kiln, its slope, its speed of rotation, and the rate of feed. Kilns which have a thin bed could be adequately heated by the flame striking the charge alone. This would permit faster rotational speed for the same production, and according to some people would reduce the B.t.u.'s and the pounds of raw materials per barrel. It is most easily accomplished in a long kiln or one in which the angle of inclination is low. Kilns in which the bed is thick because of slow rotational speed, shortness, steep inclination, etc., would probably benefit by having the flame aimed to strike not only the charge, but also the kiln coating just before it passes under the charge so that the charge is heated from both top and bottom.

Attention should be given to flame velocity in those cases where the coating, as well as the charge, is heated. High-velocity flames will have a tendency to erode the protective coating from the bricks and expose them to the severe heat in this area.

Making the slope of the burner pipe the same as, or different from, the slope of the kiln would depend on whether it is desired to have the flame sharp and to hold the load back, or whether it is desired to use a longer burning zone and avoid having the flame erode the load. When the flame impinges on the load, there is a possibility of leaving unburned fuel in the clinker, a condition resulting in poor fuel economy and inferior clinker quality and color.

At one plant there was some feeling that having the burner pipe tilted up so that it was parallel to the axis of the kiln helped reduce ring formations. Moving the burner pipe in or out, a practice which was often used in the past, is not commonly done at the plants visited.

With two concentric cylinders, a fuel pipe and a rotary kiln, and a pulverized or gaseous fuel being blown through the inner pipe, the direction of the inner pipe gains importance with the differences in the pipe diameter. A hypothetical case will serve as an illustration. A kiln with a 10-ft. diameter is lined with 9-in. bricks and has a 6-in. coating on the bricks. The slope of the kiln is ½ in. per foot. The burner pipe has a diameter of 12 in., is pivoted



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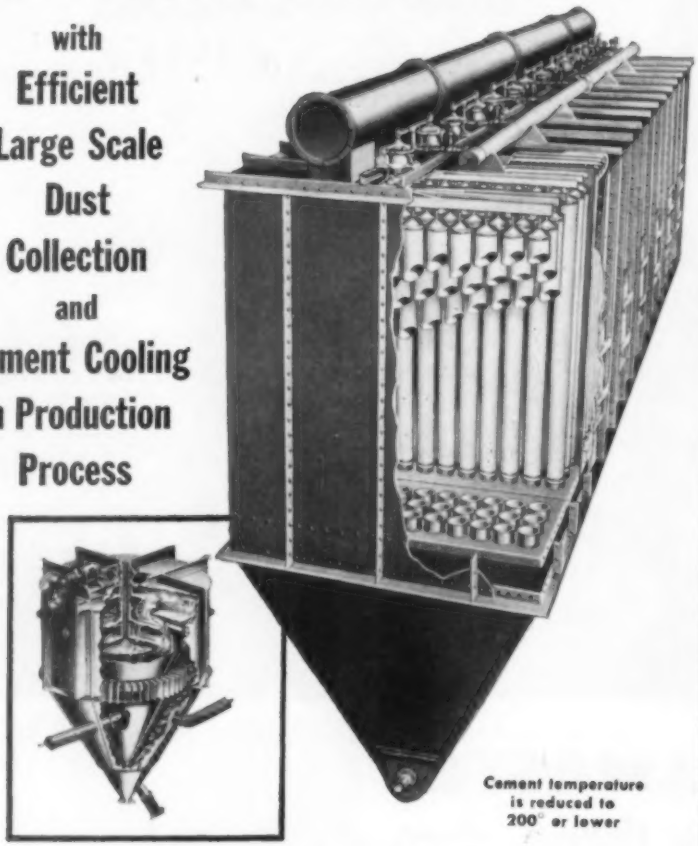

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at a distance of 12 ft. from its end, and extends just to the end of the kiln. By sighting down the bottom side of the burner pipe, the operator notes that his line of sight intercepts the kiln bottom at a distance of 78 ft. If the end of the burner pipe were dropped ½ in. beolw the pivot, the line of sight for the operator would intercept the kiln at a distance of 71 ft.

Thus small adjustments in the burner pipe effect considerable changes in the position of the flames.

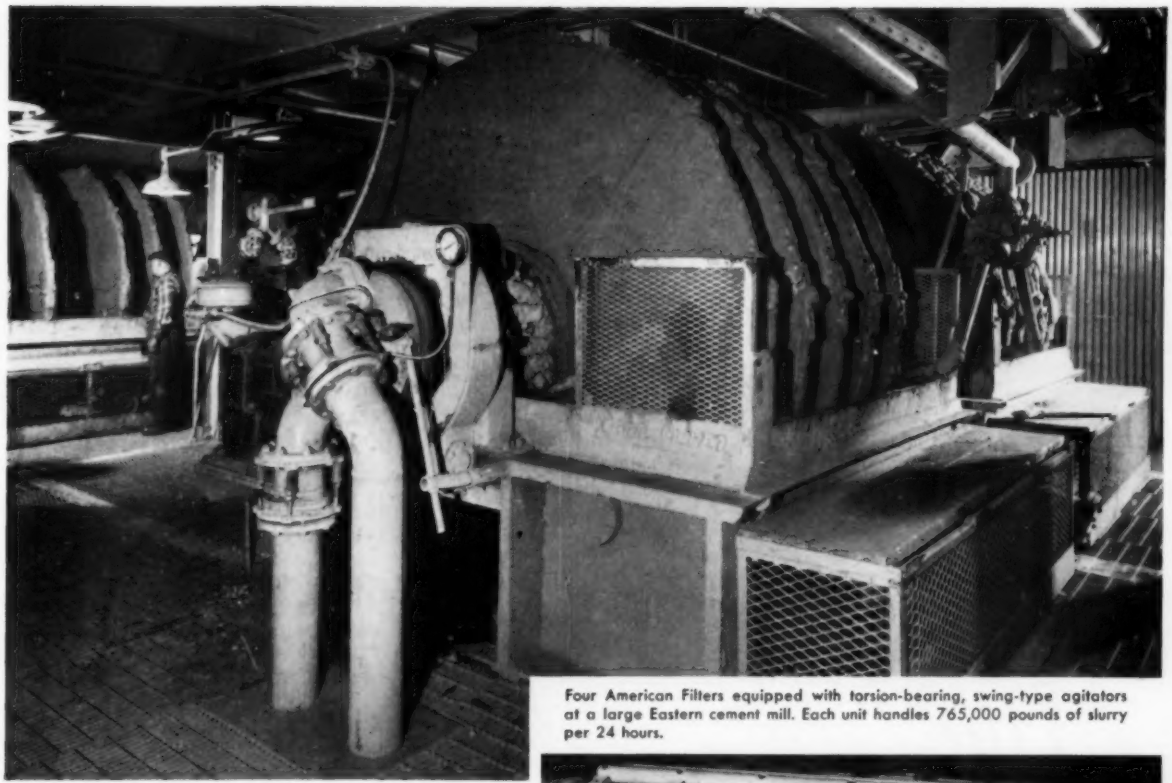
Flame Length Most operators believe that the flame length should be at the minimum for proper burning because: (1) more effective length of the kiln is made available for preparating the mix; (2) the heat is concentrated in a short area, where it is needed for clinkering; and (3) it permits quicker cooling, which may be desirable if magnesia is troublesome. In addition, one plant was forced to maintain a very short flame to avoid rings.

At one plant the suggestion was made that a short flame is better for volatilizing alkalies. The flame studied varied between 15 and 48 ft. in length. In general, the shorter kilns were operated with a shorter flame and burning zone. However, other factors, as mentioned above, often exerted even greater influence in this matter. Flame lengths were estimated from the position and condition of the coating.

Threes ways in which short flames may be produced are: 1) by adjusting the veocity of the flame; 2) by raising the percentage of primary air; or (3) by increasing the temperature of the primary air.

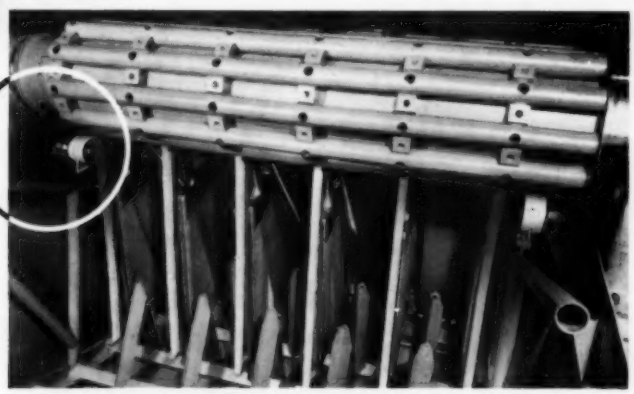
Of the six dry plants, all except one were operating with relatively short flames, and this exception was a case of a gas flame with no primary air. All of the eight wet plants except one were using a relatively long flame. This is partly explained by the fact that wet-process kilns generally use more fuel; and thus a larger volume of air passes through per unit time, causing the gas velocity in the kiln to be higher. The higher velocity kiln gases tend to carry and lengthen the flame.

In general, the plants which had long flame also had high or moderate nozzle velocity. Eight plants fall in this group. Four plants had low or moderate velocities and a short flame. One plant which uses a coal mixture containing 40 percent anthracite is an exception. For each element in flame control there are several variables. It is therefore impossible to consider any one variable (such as nozzle velocity) without



Four American Filters equipped with torsion-bearing, swing-type agitators at a large Eastern cement mill. Each unit handles 765,000 pounds of slurry per 24 hours.

New Swing-Type Agitator on **AMERICAN FILTER...**



Closeup of the new agitator installed in Filter Tank. Torsion bearings are at left and right just under the main shaft.

Latest development in continuous disc filters is a new swing-type agitator designed by Dorr-Oliver that completely eliminates troublesome stuffing boxes and assures uniform agitation from the bottom of the tank to the slurry surface. Here's how it works.

Vertical picket members are attached to the agitator. These pickets extend up between the filter discs and insure positive, uniform agitation throughout the feed slurry. Torsion bearings located on the inside of the tank walls support the agitator. These bearings incorporate a special rubber compound, bonded to the bearing support and agitator shaft, that flexes as the shaft oscillates. It is impossible for slurry to enter the bearing.

This new development is typical of Dorr-Oliver's continuing search for improved techniques in wet processing. If you'd like more information on the American Filter with the new swing-type agitator, just drop a line to Dorr-Oliver Incorporated, Stamford, Connecticut.

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keeping in mind the effects of other factors (such as percentages and temperatures of primary and secondary air).

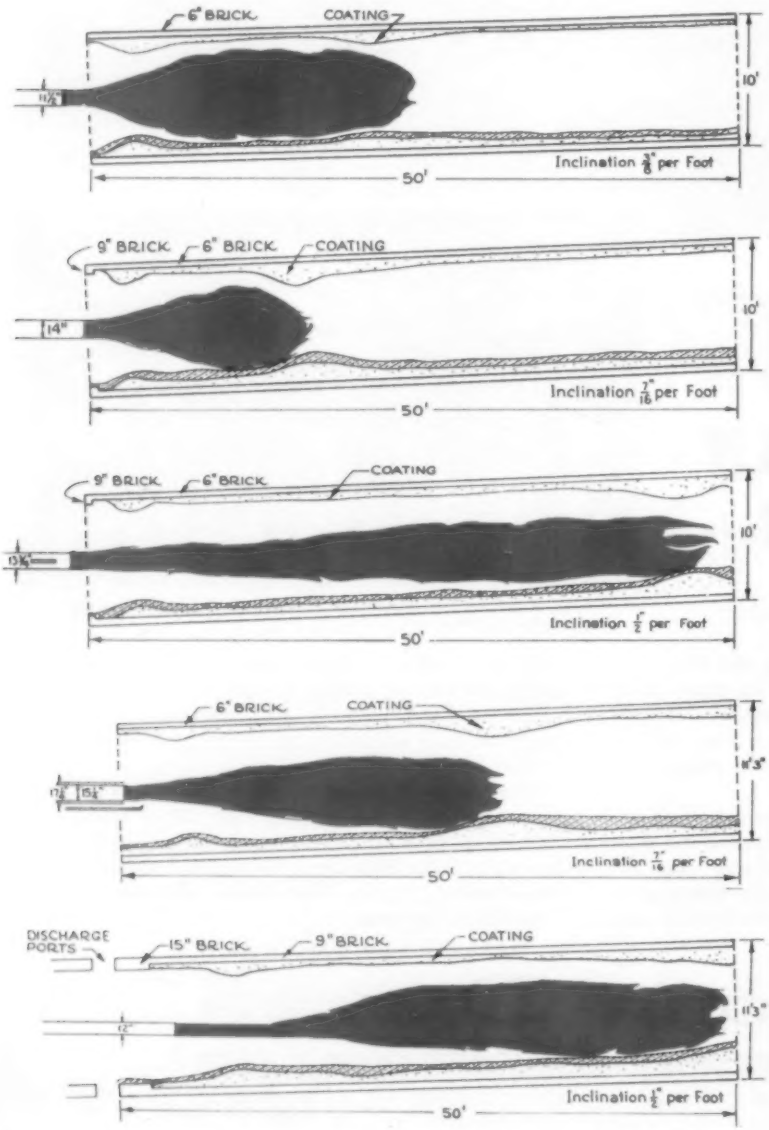
In the ranges of velocities from 3,000 to 8,000 f.p.m. the flame lengths increased with increased nozzle velocities. Beyond this range the opposite effect was noted. It is felt that the origional velocity would determine whether an increase in velocity would lengthen or shorten the flame. If the nozzle velocity of the fuel or primary air-fuel mixture is below 8,000 f.p.m., an increase in velocity would probably lengthen the flame, whereas if the initial velocity is over 8,000 f.p.m., an increase would probably result in a shorter flame.

In the plants studied, the lengths of the flames were associated to a degree with the lengths of the kilns, the shorter kilns having the shorter flames. However, in some instances, factors such as ring formation involved in the burning of a particular mix had an even greater effect on the flame length.

Flame lengths were calculated by making use of such factors as clinker build-up position, plume length, and distance between the burner tip and the kiln nose.

Figure 1 shows flame lengths (in feet) plotted against nozzle velocities. Figure 2 shows examples of various shapes and lengths of flames.

Fig. 2. Various shapes and lengths of portland cement rotary kiln flames.



Flame Velocities at Burner Nozzle Tips From observations at the plants visited, it was not possible to show a good relationship between flame length and nozzle velocity over the full length of velocities. This was probably due to other factors such as percent of primary air; however, certain opinions were collected and are reported here, in addition to those mentioned under "Flame Length."

At one plant the velocity was reduced and the flames were shortened by a choke in the coal pipe. The choke was made by installing a 12-in. diameter section in the pipe between the 16-in. fuel supply pipe and the 16-in. diameter burner pipe nose.

In contrast to the fact that a small opening makes a longer flame, personnel at another plant pointed out that a large opening makes a "bushy" flame.

When gas was used, it was noted at the same plant that the flame was "lazier" with a larger nozzle and the same gas pressure.

In a third plant it was felt that a lower velocity had a tendency to make a reducing flame, which resulted in a very thick kiln coating.

It was necessary in one plant to pull back the burner pipe when its diameter was decreased, to keep the burning zone in the same place.

Percentages of Primary and Secondary Air Percentages of primary air open up a field for considerable discussion; even in a single plant, opinions vary widely as to the amounts necessary. The amount of primary air is obviously one of the determining factors in the length of the flame. This is shown by four plants using high primary air and having a short flame, compared to seven plants using low primary air and having a long flame. Exceptions noted were two plants, one of which was using a coal mixture containing 23 percent anthracite with lower primary air and getting a short flame.

Greater amounts of primary air tend to make a larger amount of air (oxygen) available for immediate ignition of the fuel as soon as the mixture reaches the proper temperature, whereas smaller amounts of primary air would result in delaying combustion until secondary air became available. Adding the same amount of primary air with a smaller burner pipe would probably tend to lengthen the flame by producing a higher flame velocity. In one plant elimination of primary air cut the gas usage about 20 percent. It also

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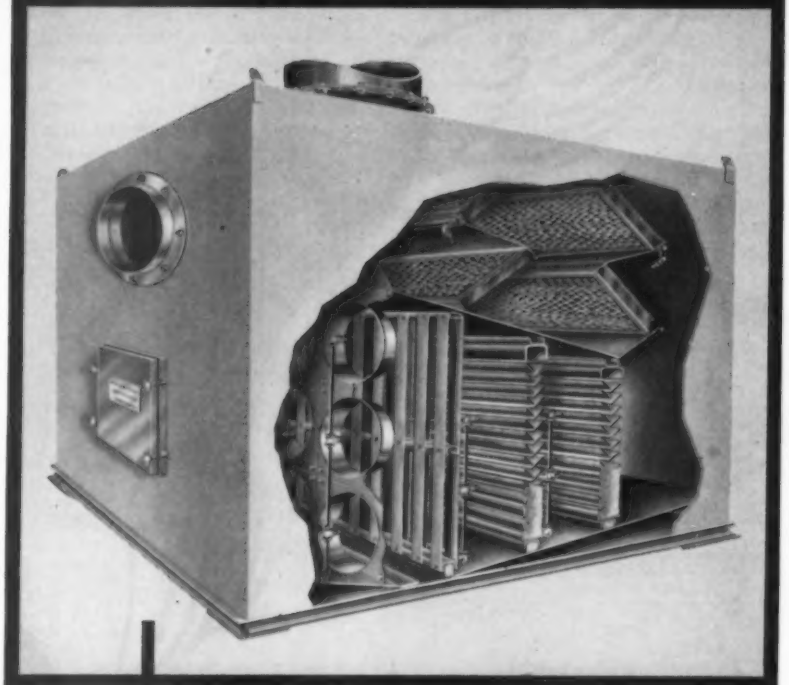

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cut down ring formation—especially nose rings—and resulted in a softer condition of the nose rings which did form.

Mention was made of one plant where 100 percent primary air was used with coal, which resulted in a blue flame resembling gas in its low luminosity.

An interesting experience with respect to ring formation as associated with primary air percentages has been noted and is reported here:

By increasing the nozzle diameter from 8 to 9¾ in. and increasing the fan speed, the primary air was increased from 18 to 25 percent, with no decrease in velocity.

It was noted that the frequency of clinker ring formation decreased to a very marked extent.

Other results noted were a decrease in the rate of flame propagation, and a shorter and sharper flame.

It was felt that this increase in primary air resulted in the elimination of secondary combustion and possibly a reducing condition behind the burning zone. An area of secondary combustion of appreciable size could cause clinkering of the raw mix at about normal burning temperatures farther back in the kiln than desired. A reducing condition might result in lower melting point compounds not far behind the burning zone, which would clinker at much lower than normal burning temperatures.

The changes and results listed above also added authority to an old combustion principle which states that primary air should be "1 percent for each percent of volatile matter in the coal."

Temperatures of Primary and Secondary Air The temperatures of the primary and secondary air in the range encountered for the fuel-air mixtures in this study seemed to have little effect on the length of the flame. Apparently the increased activity of the oxygen particles at higher temperatures was nearly offset by the decreased density of the gas. It has been shown by a study of combustion air temperatures and fuel consumptions that the amount of fuel saving is equivalent to the heat absorbed from the clinker.

Excess Air The higher ranges of excess air encountered as shown in Table VII were probably not so much the result of the wishes of the operator as of inadequate measurement. At nine plants the excess air (oxygen) was closely scrutinized and used as a means of controlling the burning operation. In every plant where exit gas analysis was

used at all, it was regarded as very important, and the range was closely controlled. At some plants it is considered the key instrument, along with draft recorders, for quality and fuel efficiency control. Another plant shows definite reductions in fuel requirements by use of oxygen recorders. At plants where exit gas analysis was not regularly made, the average excess air was found to be between 10 and 14 percent. Where the exit gas analysis was a part of daily plant testing, the average excess air was in the range of 3 to 6 percent except for special purposes.

Several operators commented on having seen instances of kiln operators who increased the fuel addition to a kiln which already had a surplus of coal when no oxygen recorder was available. There is clear indication of the desirability of measuring and controlling excess air.

Addition of Moisture Discussions on adding moisture to the flame were based mostly on opinions. Some experimental work had been done, and other work was being planned, but few were adding moisture during normal production.

Further experimental work will be required to determine the economic desirability of the addition of moisture. Effects on brick life and kiln coating were not available. Heavy demands on cement production and the possible undesirability of imposing a further variable on the burner have slowed research and development along this line.

The reasons for adding moisture were varied. Here are a few:

1. It was felt that the addition of moisture might be an aid to putting on kiln coating. Because of the decreased temperature and lower velocity it would be easier to build coating.
2. Moisture was considered by some as a means of reducing alkalies in the clinker.
3. A suggestion was made that a flame with water vapor in it radiates heat better than a dry flame.
4. Moisture in the flame may have a catalytic effect on the release of CO_2 from the limestone.

Ring Formation and Kiln Coatings A variety of causes for three types of rings were suggested in various discussions on burning.

1. Nose rings
   (a) Changes in temperature of secondary air
   (b) Nose brick which act as a dam
   (c) Coarse coal
   (d(Low silica ratio

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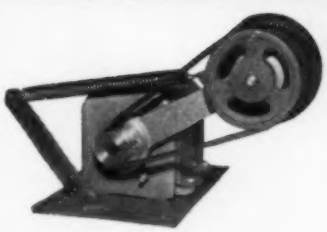

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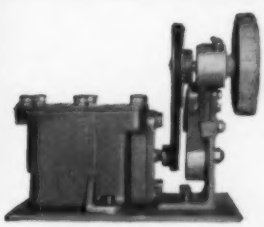

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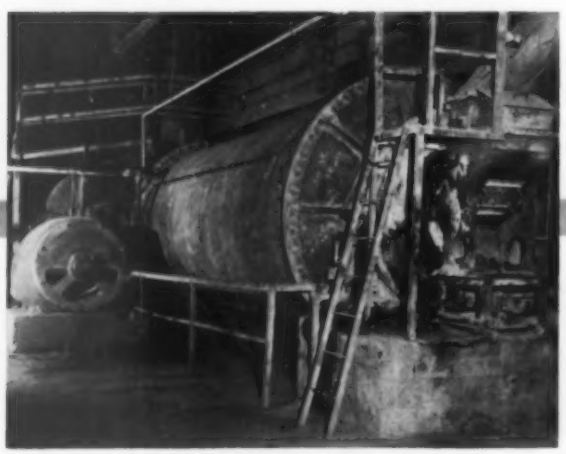

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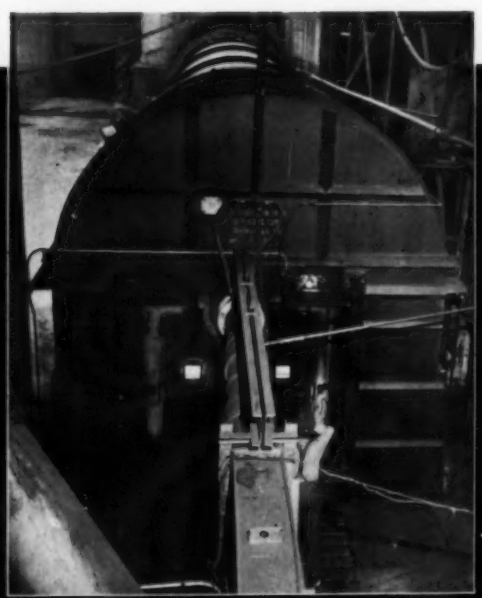

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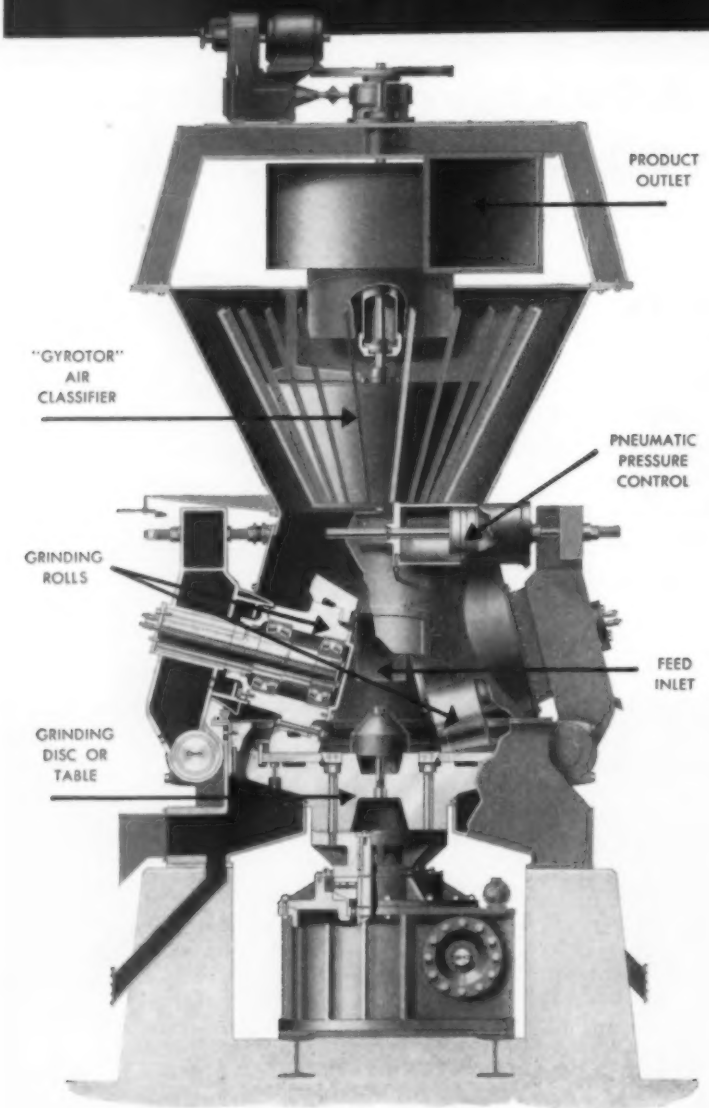

The Hardinge Disc-Roll Mill is a roller-type mill with two adjustable, pneumatically loaded rolls for grinding material on a horizontal rotating disc or table (Loesche type). The Hardinge "Gyrotor" Air Classifier, in combination with the mill, provides a complete grinding, classifying, and drying system. A full description is given in Bulletin 52-8.

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(e) Long plume on flame (secondary combustion)
(f) Reducing flame
2. Burning zone flame
(a) Wet coal
(b) Coarse coal
(c) High sulphur coal
(d) Variations in mix
(e) Variations in flue dust addition
(f) Erratic feed
(g) Low silica ratio
(h) Secondary combustion
(i) Changing position of burner pipe
(j) Moving burning zone back and forth
(k) Improper nodulization (low moisture)
(l) Improper iron-alumina ratio
(m) Excessive fineness of raw mix (over 90% 200-mesh)
(n) Drop in primary air
(o) Slurry moisture fluctuations
(p) Stiffeners to save bricks
(q) Non-uniformity of raw mix fineness
3. Mud rings
(a) Low temperature in back end
(b) Fluctuations in temperature
(c) Small-diameter kiln with chain section
(d) Chain links too small to break up formations
(e) Addition of dust before chains

Brick Life A few factors mentioned as being associated with brick life are the following:

1. At one plant it was noticed that brick life started to drop about the same time that draft fans for the dust collectors were installed.

2. At a second plant it was felt that brick failures began to show up at about the same time that coal fineness dropped.

3. A second factor mentioned by these operators as being hard on bricks is the soaking heat they get from ring formations.

4. It was mentioned that a long, snappy flame is especially destructive.

5. Frequent shutdowns are felt to reduce brick life because each time the coating drops off, it pulls off a thin layer of brick.

In summation, two important components of rotary kiln operation which affect brick life are stability of operation and intensity of burning. It is well known that regularity or constancy of process is economical not only of fuel, but also of equipment, including expendable materials i.e., kiln linings. Decreased brick life resulting from increased intensity or

Table I—Available Control Factors

	No. Plants
Discharge-end draft gauge	10
Feed-end draft gauge	13
Burning temperature recorder	6
Back-end temperature recorder	13
Exit gas analysis	10
Liter weights	7

Table II—Methods Used for Control

	No. Plants
Fuel changed—kiln and feeder constant	11
Fuel constant—kiln and feeder changed	3

Table III—Summary of Plant Practice on Flame Direction

	No. Plants
Pipe tilted downward to slope of kiln and turned to load side of center	6
Pipe parallel or upward to slope of kiln and turned to load side of center	2
Pipe tilted downward to slope of kiln and parallel to vertical centerplane	5
Pipe parallel to slope of kiln and parallel to vertical centerplane	1

Table IV—Summary of Flame Lengths (Not Including Plume)

	No. Plants
Very long (over 40 ft.)	1
Long (35-40 ft.)	2
Moderately long (28-34 ft.)	5
Moderately short (25-26 ft.)	3
Short (20-24 ft.)	2
Very short (less than 20 ft.)	1

Table V—Summary of Flame Velocities at Burner Nozzle Tips (1 Plant Using 2 Fuels)

	No. Plants
High (over 10,000 f.p.m.)	5
Moderate (5,000-10,000 f.p.m.)	6
Low (under 5,000 f.p.m.)	2
No information	2

Table VI—Summary of Primary Air Percentages

	No. Plants
High (30% or more)	4
Low (26% or less)	8
None	1
No information	1

severity of burning, as caused by an increased velocity or temperature, is implied by statements 1 through 4 above.

Helpful Suggestions

Persons who contemplate an analysis of and possible changes in the burning operation of their kilns might find the following suggestions helpful in gaining full benefit from the experience at the 14 plants included in this study.

1. List and analyze the changes in equipment of operation which have been made in the burning department, relying most heavily on written records.

2. Recall what benefits were expected or desired.

3. Evaluate the changes to determine whether or not the expected benefits were achieved.

4. Collect and record data on current practices, such as velocities, temperatures, percentages, etc.

5. By comparison with the plants listed in this report, determine what changes, new equipment, or adjustments would be needed to bring current operations to the desired standard.

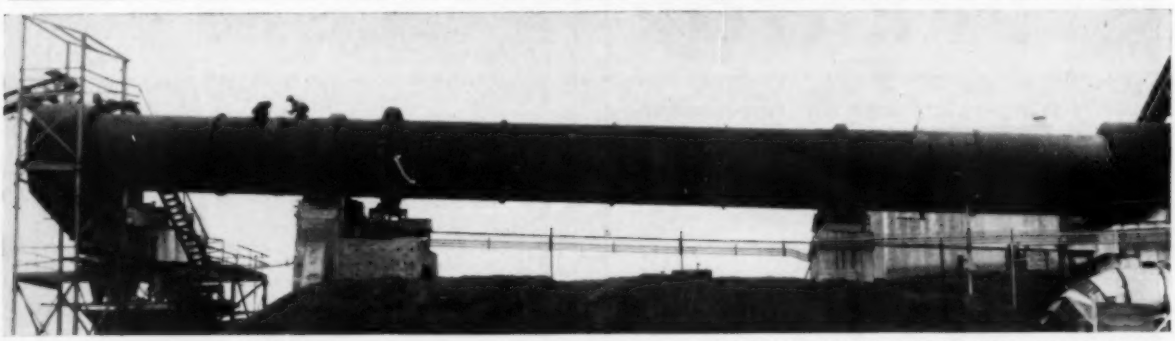
6. Changes in the operation or equipment should be made only when kiln operation is stable as far as present limitations permit.

7. Change one variable at a time, so that benefits may be properly evaluated.

8. Make adjustments slowly—allowing time for stability to be achieved before the next change.

Table VII—Summary of Excess Air (One Plant Using 2 Fuels)

	No. Plants
High (over 10%)	3
Moderate (4%-10%)	7
Low (3% or less)	2
Deficiency	1
No information	2



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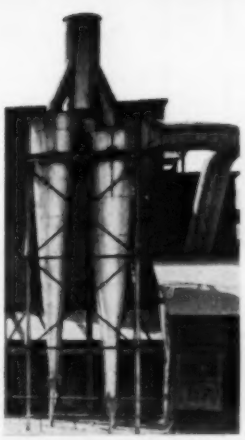

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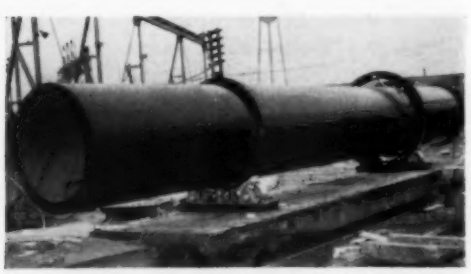

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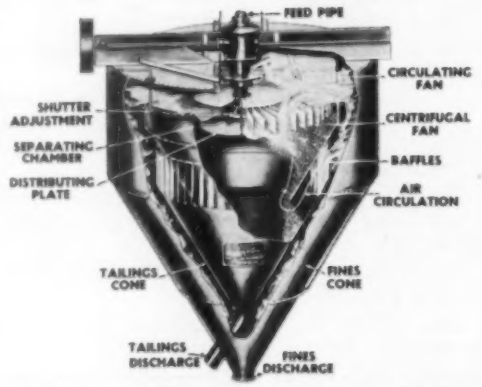

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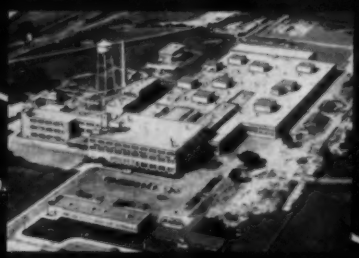
INDEX TO ADVERTISERS

*Allis-Chalmers Mfg. Co. 76-77
*Babcock & Wilcox Co. 106-107
*Bailey Meter Co. 152-153
*Barber-Greene Co. 120
Bradley Pulverizer Co. 151
*Buell Engineering Co., Inc. 110-111
Cleveland Vibrator Co. 148
*Combustion Engineering, Inc.
Raymond Division 132-133
Continental Boiler & Sheet Iron Works 146
Day Company 156
Dewey & Almy Chemical Co. 142-143
*Dorr-Oliver, Inc. 159
*Easton Car & Construction Co. 67
Ensign Electric Co. 163
*Falk Corporation 105
*Fuller Company 80-81
General Cable Corp. 155
*General Refractories Co. 83
Giffels & Vallet, Inc. 169
*Gruendler Crusher & Pulverizer Co. 140
*Hardinge Co., Inc. 166
Heineken, Inc., W. P. 167
*Hewitt-Robins, Inc. 124-125
*Ingersoll-Rand Co. 157
International Nickel Co. 90-91
*Iowa Mfg. Co. 139
*Johnson-March Corp. 162
*Kennedy-Van Saun Manufacturing & Engineering Corp. 68-69, 164-165
Kensington Steel Co. 141
Koppers Co., Inc. 170
Laclede-Christy Company, Div. of H. K. Porter Company, Inc. 137
*Lippmann Engineering Works 95
MacDonald Engineering Co. 113
*McLanahan & Stone Corp. 117
*Merrick Scale Mfg. Co. 122
*Nordberg Manufacturing Co. 86-87
Norfolk & Western Railway 150
*Northern Blower Co. 158
Northwest Engineering Co. 101
Pennebacker Company 144
Percy Kent Bag Co., Inc. 140
*Pioneer Engineering Works, Inc. 147
*Porter Co., Inc., H. K. 137
*Raymond Bag Co. 161
*Raymond Division, Combustion Engineering, Inc. 132-133
*Research-Cottrell, Inc. 84-85
Schaffer Poidometer Co. 74
Simpson Co., Orville 138
Sly Mfg. Co., W. W. 154
*Smidth & Co., F. L. 65, 172
*Thor Power Tool Co. 145
Tool Steel Gear & Pinion Co. 118-119
Torrington Company 123
Treadwell Engineering Co. 151
United States Rubber Co. 129
Universal Road Machinery Co. 168
*Werco Steel Co. 100
*Western Precipitation Corp. 96
Wilfley & Sons, Inc., A. R. 66
*Williams Patent Crusher & Pulverizer Co. 171

*See also Detailed Information in 1956 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK.



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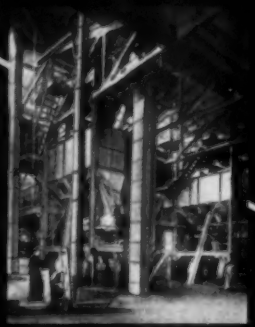

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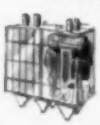

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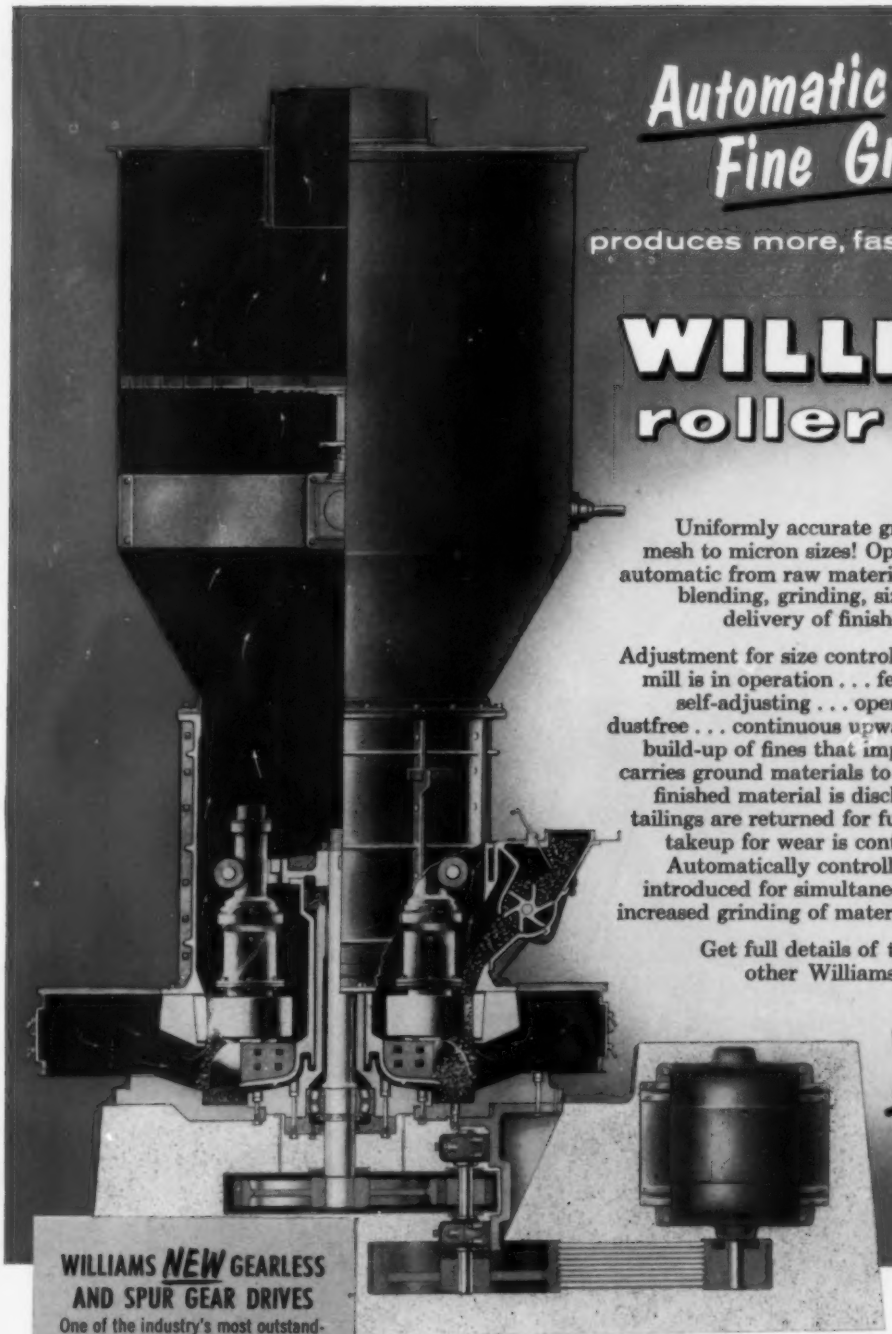

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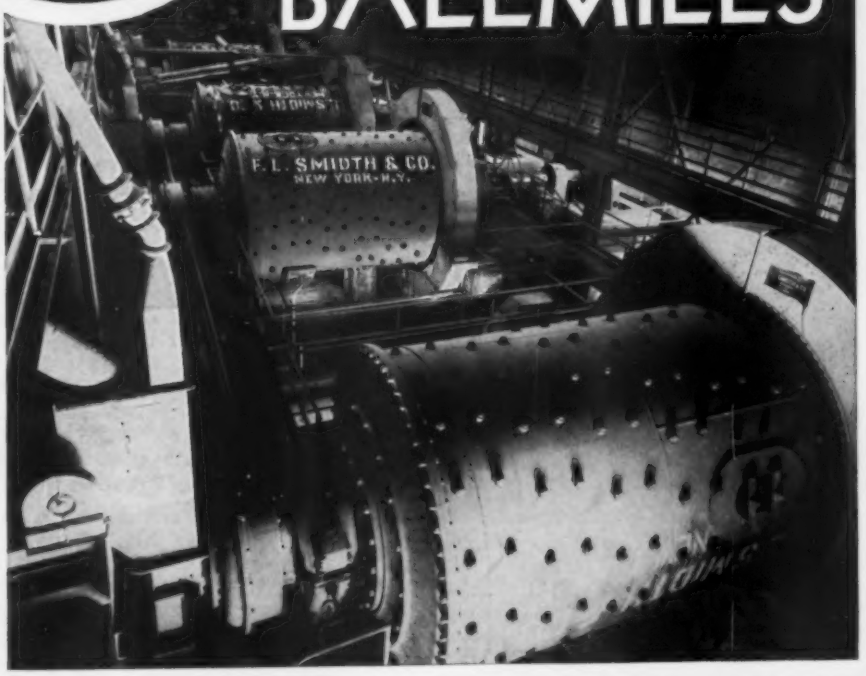

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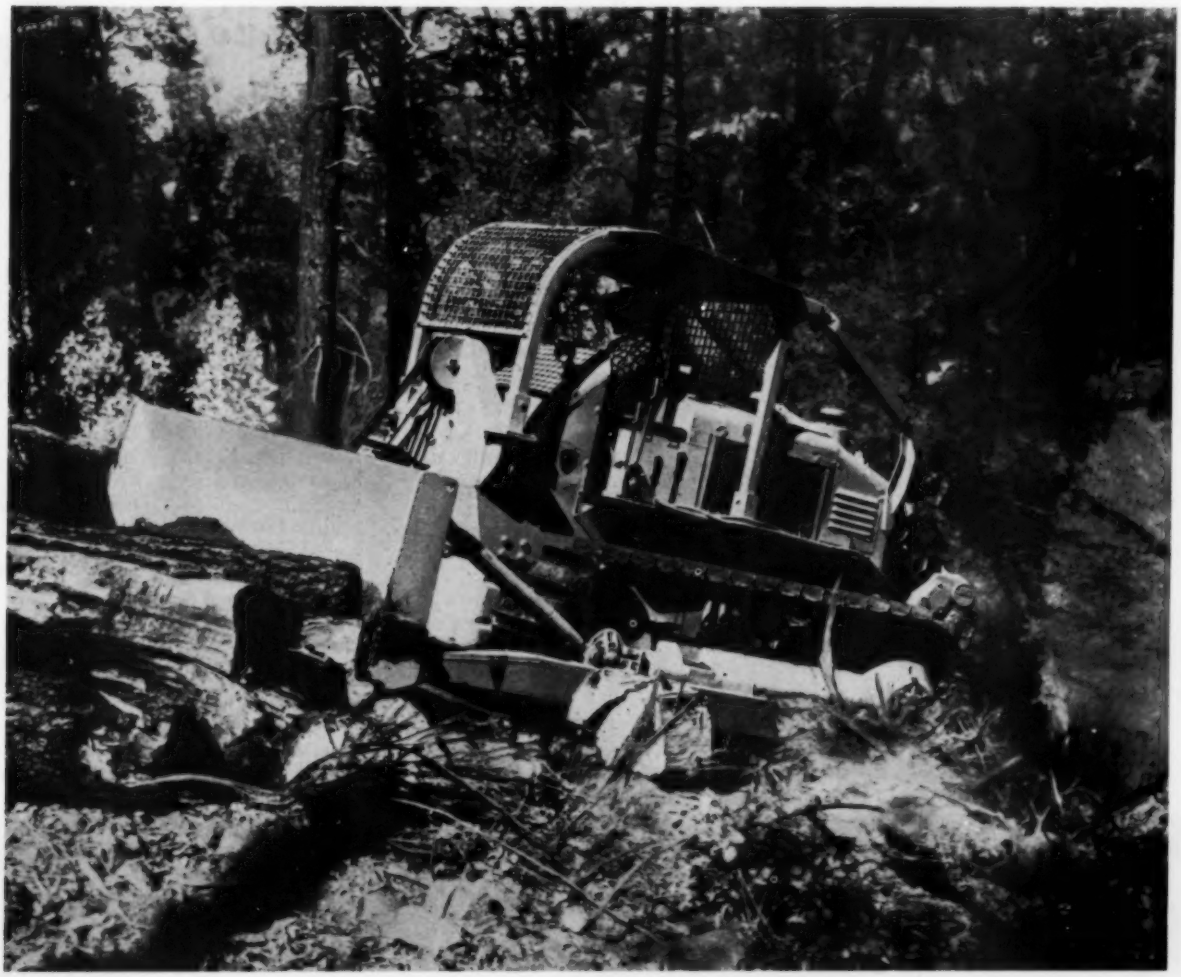

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New Crystal Lake Plant For Consumers Company

Another ON THE SPOT Report

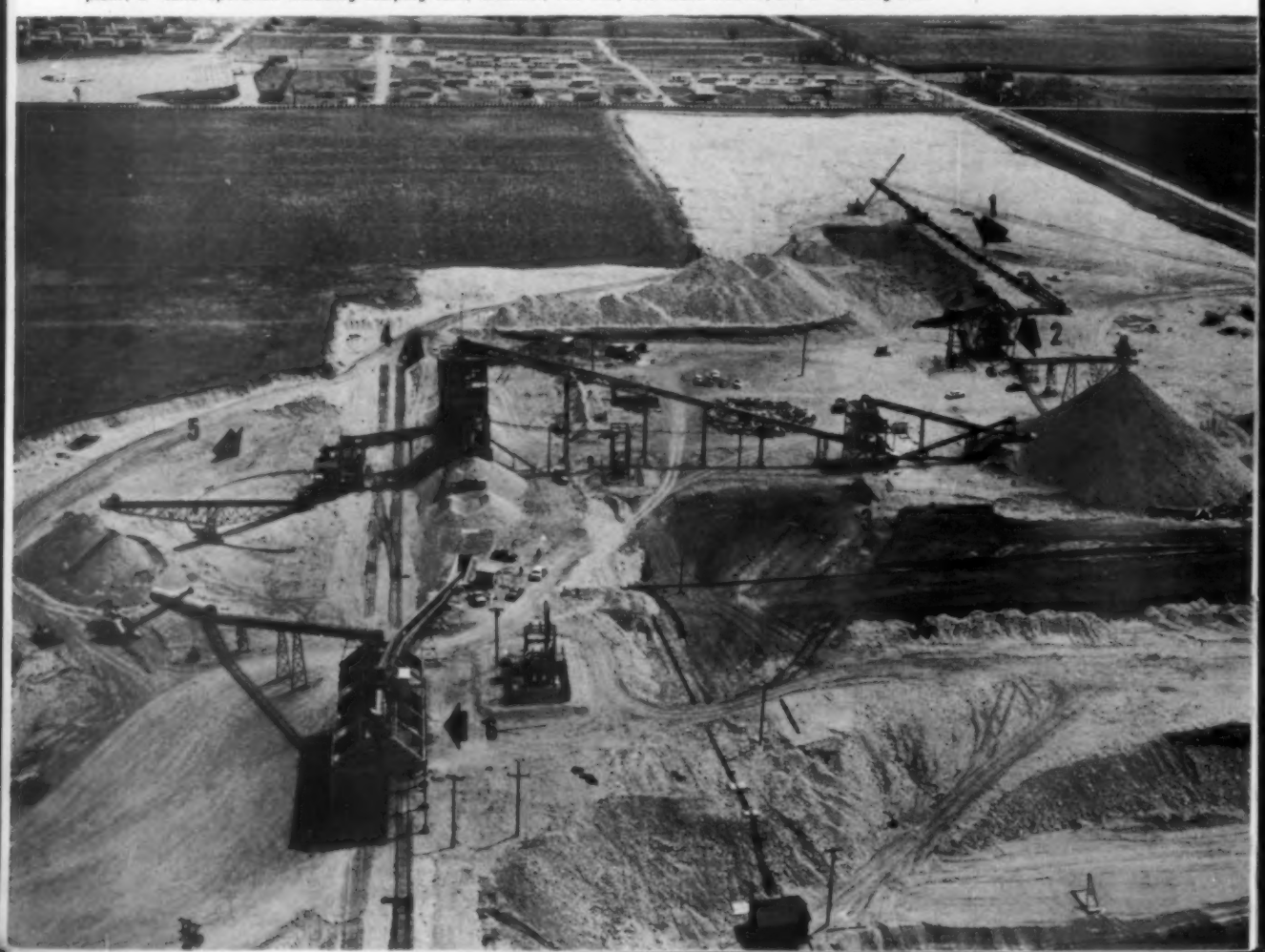
WITH the two-fold purpose of meeting heavy demand for sand and gravel and replacing an older facility where reserves were at the point of exhaustion, the Consumers Company of Chicago recently placed in operation a new 450-t.p.h. plant which is nearly fully automatic and is one of the most modern in its competitive area. Located on a 400-acre property near Crystal Lake, Ill., the new facility was designed around three basic points—economy of investment and operation, a high degree of flexibility, and the ability to blend finished products within the full range of a number of different aggregate specifications.

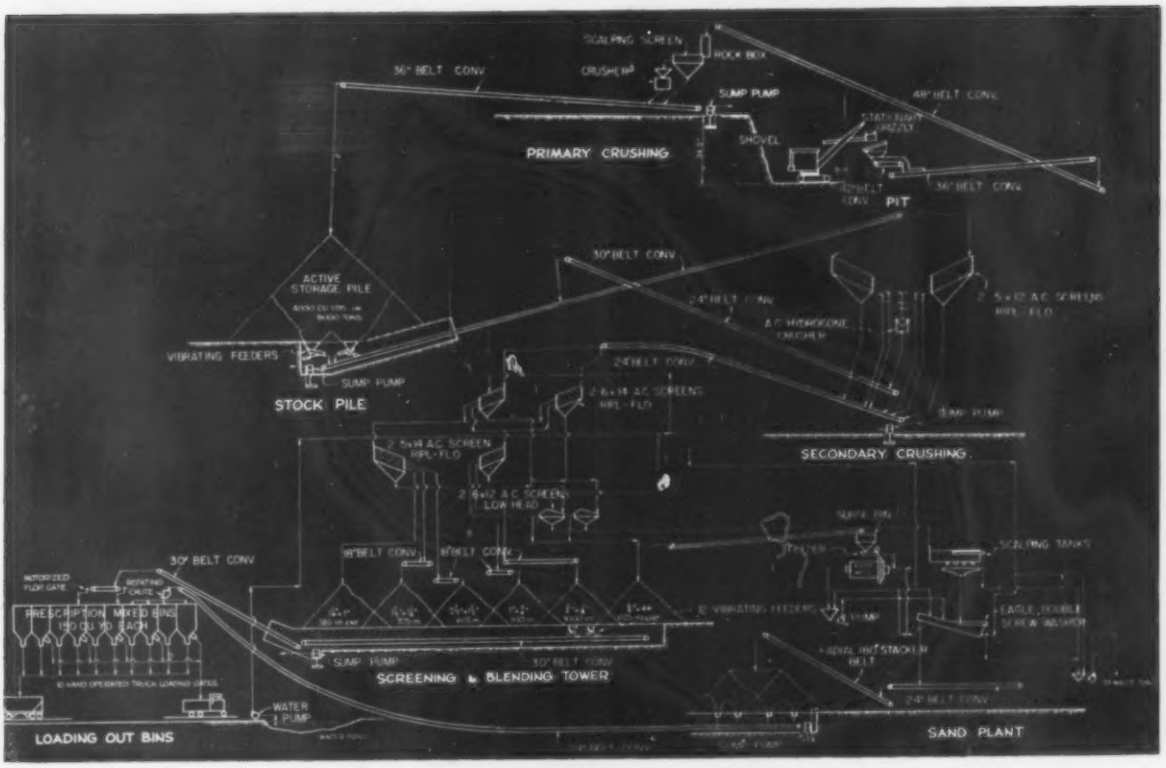
With a general plan developed by Consumers Co., the project was let to Western Knapp Company, a division of Western Machinery Company, for detailed designed and construction. Under the direction of J. D. Bertoglio, district manager, Western Knapp's Chicago staff de-

By BUREN C. HEROD

veloped five different plant layouts, from which the one in use was selected as most suitable. Featuring pit-to-plant conveyor "haulage," an interlocked processing flow, and a completely independent pit system, the entire operation is controlled from just two points. With capacities of 750 t.p.h. in the pit, 450 t.p.h. through the plant, and 900 t.p.h. in loading, the pit and loading operations need only be carried out on

In this general aerial view of the Crystal Lake plant, taken while the pit was being opened, the arrows indicate the main operating components as follows: 1—nested field conveyors; 2—primary crusher and scalper; 3—secondary crusher and screens; 4—washing and sizing plant; 5—sand operation including scalping tank, classifier, rod mill, and radial stacker; and 6—loading bins.





In this elevation flow diagram of the new Consumers Crystal Lake plant, the main operating sections are identified along with the equipment involved.

one shift to accommodate two-shift production of the processing plant.

Following the decision early last year to build a new plant, Consumers acquired the property. Officials soon ran into a zoning problem with the local zoning board, and when the matter was settled, the company was restricted to a 40-acre tract for its plant site. Accordingly, a centralized location was selected that would allow exploiting the surrounding sand and gravel area to its farthest extent with the most favorable conveying layout.

Plant site grading and installation of trackwork between the site and the nearby line of the Chicago and North Western Ry. was accomplished in June. Immediately thereupon the Western Knapp construction crew, under the direction of E. V. McClure, moved onto the property. The primary, or pit system, was ready for operation by February of this year, and early in April erection of the entire plant was completed. Mr. McClure remained at the plant during its break-in period to supervise final adjustment and to train personnel.

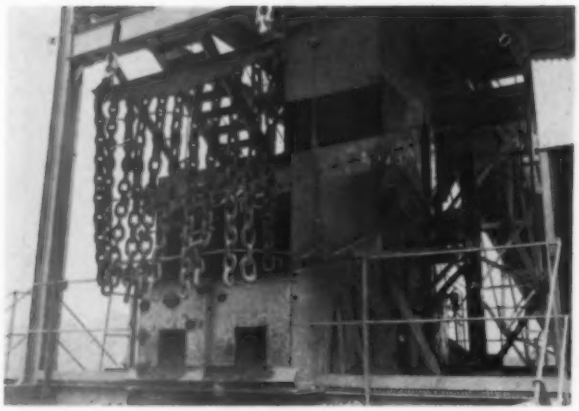
The deposit, which is of glacial origin, contains about 25 percent of plus 2-in., and approximately 50 percent plus 4-mesh material. An insignificant quantity of boulders exceeding 16 in.—the spacing used on the pit grizzly—is encountered. A 101 Lima shovel rigged as a dragline was used to open the pit, and when a cut about 35 ft. deep had been established, the shovel was equipped with a 3½-cu. yd. dipper and installed in the pit for regular operation. With an average of two cycles per minute, the shovel dumps the material onto a rail grizzly. Sand and gravel passing the grizzly is received on a 10- by 10- ft. Western Knapp designed and fabricated 42-in. belt feeder. This unit is semi-portable and can be located on either side of the field conveyors which it can feed at the rate of 750 t.p.h.

These horizontal field conveyors, of which eight are available, are 36-in. by 119-ft. units with inclined head and tail sections that allow "nesting" at connecting points. They are a part of a conveying system which, with two exceptions in the entire plant, was supplied by Barber-Greene. The components of this system range from 18 in. by 28 ft. to 36 in. by 276 ft. in size, with capacities varying between 25 and 750 t.p.h. Many of the accompanying photographs of the plant and conveying sections are shown through the courtesy of the manufacturer.

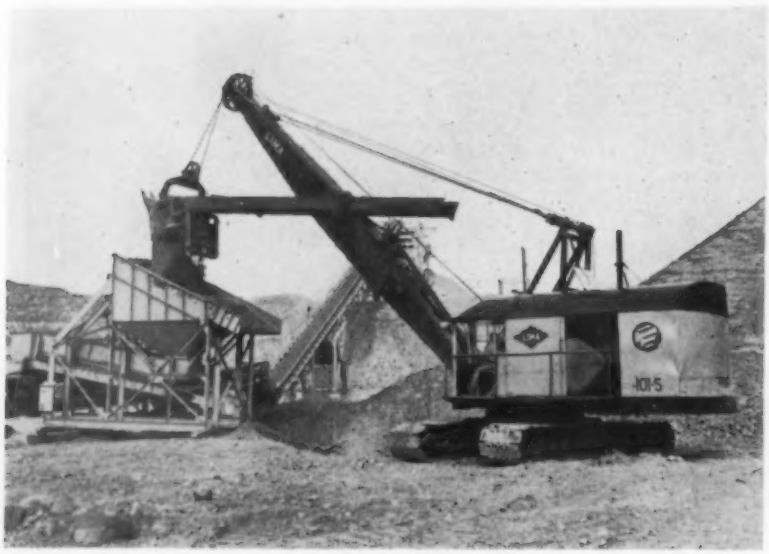
Each field conveyor has a belt speed of 400 f.p.m. with drive furnished by a 15-hp. motor. The last unit in the pit system delivers material to the main feed conveyor that supplies the primary crushing department. Supplied by Western Knapp, it is a 36-in. by 100-ft. conveyor that can, by adding standard Barber-Greene sections, be extended to 300 ft. These field conveyors are equipped with a trip wire which, as a safety measure, allows pit workmen to stop the belts at any point along the system.

In normal operation the last field conveyor can be swung through a 180-degree arc from the tail of the main feed belt, to which it discharges, while the balance of the field conveyors can be extended in a line that will allow the shovel to operate, with the number of conveying units now on hand, to a distance of about 1,000 ft. from the main feed conveyor. Since each field conveyor is equipped with lifting bails, the shovel can add, or remove, units as desired and locate them in any direction of pit advance.

Pit run material received on the 48-in. by 235-ft. 9-in. main feed belt is carried from the pit floor up to the primary crushing installation. A plug chute equipped with a pressure-sensitive lockout system receives the pit material ahead of the scalp-



If pit run material should load up in the chute feeding this scalping screen, a pressure-sensitive device automatically stops the preceding conveyors.



The grizzly-feeder combination, shown with the shovel in this view of pit operations, can be located on either side of the field conveyors which it supplies.

As seen in this illustration, each of the 119-ft. field conveyors has a pair of lifting bails by which it can be slung from the shovel boom and relocated as desired.

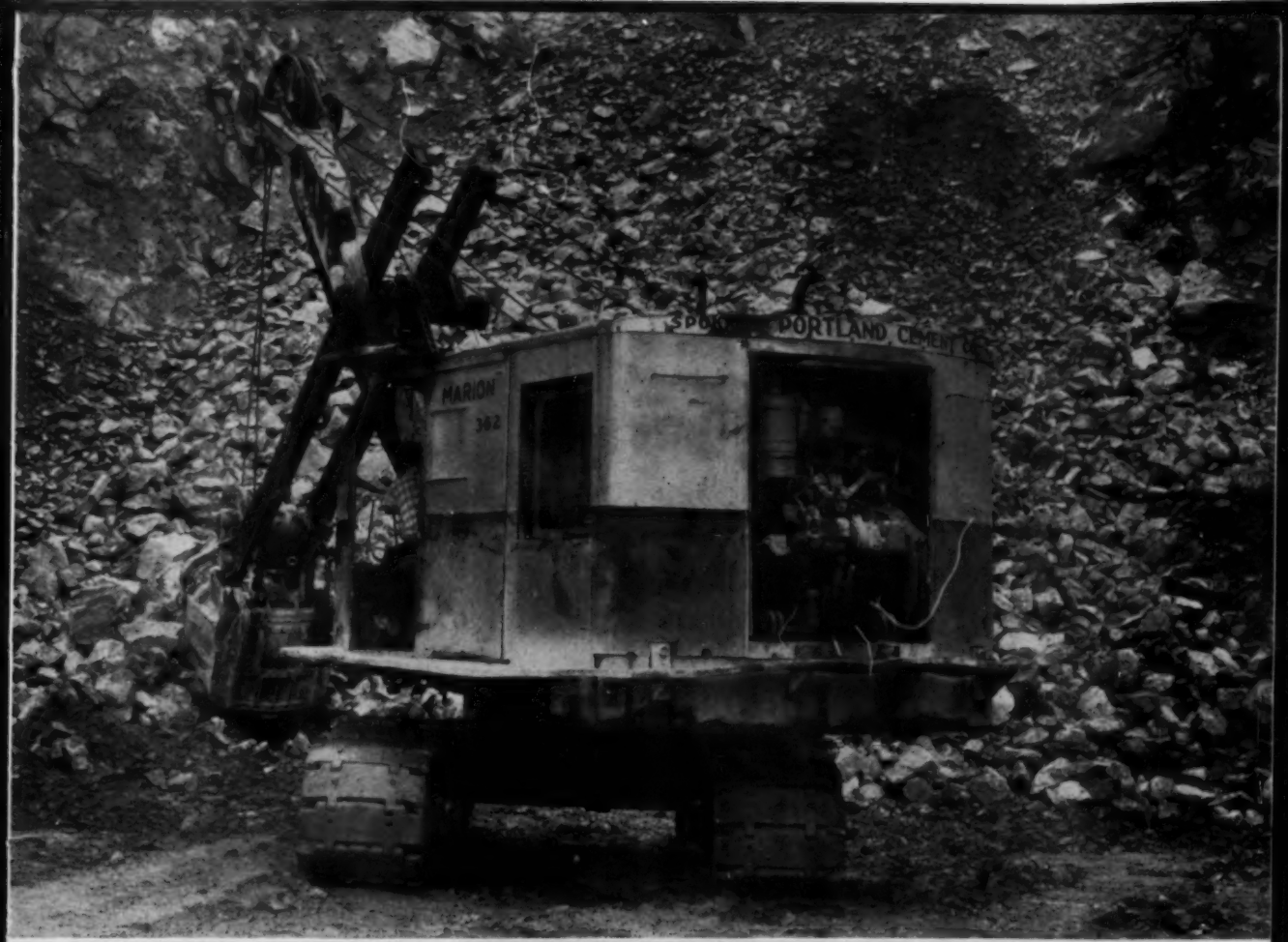
ing screen. In the event that the scalper—a 5- by 14-ft. Allis-Chalmers single-deck unit with 2½-in. openings—loads up, material backing up in the chute will open the electrical circuit to the main feed and field conveyors and automatically lock out the preceding equipment.

The 2½- to 16-in. material retained on the scalper is fed to an Allis-Chalmers 12K crusher driven by a 150-hp. wound-rotor motor. Reduced through a 2½-in. setting, the crusher discharge joins the scalper throughs on a 36-in. by 277-ft. conveyor with a belt driven at 400 f.p.m. by a 100-hp. motor. Material is carried to a discharge point above a 6,000-ton active storage pile from which the secondary crushing department is fed. The entire system from and including the belt that supplies the surge pile back to the pit grizzly is independent of the balance of the operation, and is controlled from a panel in the primary crusher house.

In a tunnel below the surge pile two Jeffrey electric magnetic vibrating feeders, each with a capacity of 225 t.p.h., transfer the material to a 30-in. by 215-ft. reclaiming conveyor. The feeders below the surge pile are calibrated to deliver at any desired rate according to a predetermined amperage setting, and are controlled from a panel in the secondary crusher house. The tunnel housing the lower portion of the inclined conveyor is made up of 108-in. diameter Armco liners. With a belt speed of 410 f.p.m. furnished by a 50-hp. motor, the conveyor carries 450 t.p.h. to the top of the secondary crushing structure, where the material is split to a pair of Allis-Chalmers 5- by 12-ft. triple-deck Rinl-Flo screens.

The screen openings on the top, middle, and bottom decks of both units are 2½, 1½, and 1 in., respectively. Material retained on all six decks can be chuted to the secondary crusher — an Allis-Chalmers 760 Hydracone—or gravel retained on the lower two decks of each screen can, by flop gate control, join the minus 1-in. throughs for transport to the sizing and washing tower. Gravel reduced through the normal ⅞-in. setting of the secondary crusher follows a closed circuit via a 24-in. by 107-ft. conveyor, which returns it to the secondary crushing plant's feed conveyor supplying the screens above.

From the secondary crushing operation the material is carried to the top of the sizing and washing



NO "TIME OFF" IN EIGHT YEARS

Working 40 hours a week the year around, the CAT* D13000 Engine in this 1½-yd. Marion shovel has had *no major repairs in eight years.* It provides steady, dependable power for loading out 700 tons a day of limestone cement rock for Ideal Cement Company at its quarry near Northport, Washington. This operation was formerly under direction of Spokane-Portland Cement Co.

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MODERN
HEAVY-DUTY POWER

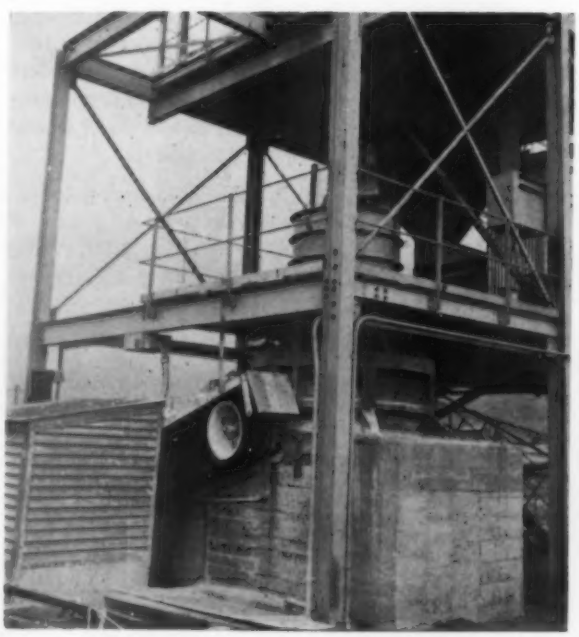
The 6,000-cu. yd. active storage surge pile, left, is supplied minus 2½-in. material from the scalper above the primary crusher, right, and that reduced by the crusher.

tower on a 24-in. by 304-ft. conveyor belt that travels 300 f.p.m. with drive furnished by a 60-hp. motor. A lockout system similar to that for the scalping screen shuts down all preceding equipment as far as the surge pile in the event that the chutes leading from the conveyor to the top two screens, or the screens themselves, are blocked or blinded.

The top screens—6- by 14-ft. Allis-Chalmers double-deck Ripl-Flos—are fitted with 1in. opening top, and ⅜-in. opening bottom decks. Gravel retained on the top deck of each of the two screens is chuted to the "coarse" side of the plant, where it is sized on a 5- by 14-ft. triple-deck Ripl-Flo with 1½, 1¼-, and ⅜-in. openings in the top, middle, and bottom decks, respectively.

Finished products made here are routed to separate stockpiles. The 2½ by 1½-in. material is taken on an 18-in. by 106-ft. horizontal boom conveyor of 70 t.p.h. capacity and discharged onto a stockpile of that size normally containing about 615 cu. yd. The 1½- by 1¼-in. size is transported on an 18-in. by 66-ft. boom conveyor of 50 t.p.h. capacity to discharge onto a 375-cu. yd. stockpile of that material, while the 1¼- by ⅜-in. product retained on the lower deck is dropped directly to an underlying 385-cu. yd. stockpile.

Left: A view of the secondary crushing department and the surge pile. The secondary crushing circuit is closed by the short conveyor at the right.



Left: A ⅞-in. setting is normally used on this secondary crusher. Discharge is returned to the primary screens in closed circuit.

Below: These feeders below the surge pile deliver material to belt that supplies the primary screening and secondary crushing operation.

This coarse screen can be eliminated from the flow altogether, or, with screencloth changes, can be added to the process of making greater amounts of smaller sizes (usually accompanying a change in the setting of the secondary crusher).

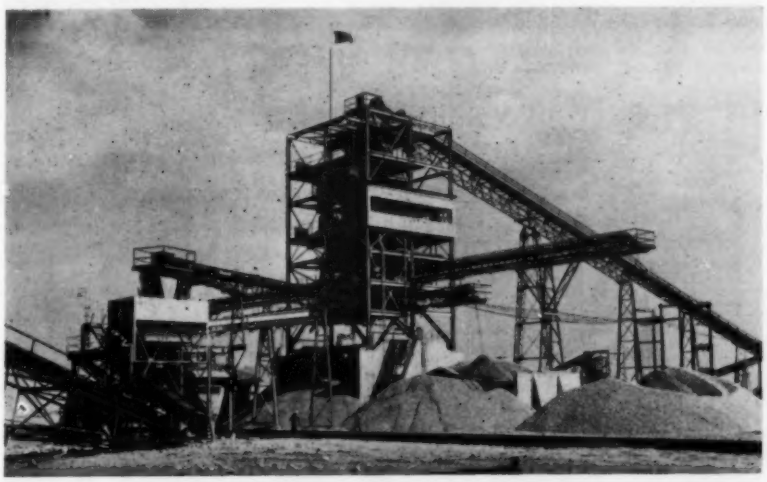
Material retained on the lower decks of the top screens is chuted to a double-deck 5- by 12-ft. Ripl-Flo. This unit, with a ¾-in. opening top deck and a ⅜-in. opening bottom deck, separates the 1- by ¾-in. and ¾- by ⅜-in. sizes of finished product. These two grades are conveyed from the tower on separate horizontal belts. The larger size is carried on an 18-in. by 28-ft., 60-t.p.h. conveyor, and the smaller material on an 18-in. by 76-ft., 120-t.p.h. unit, to discharge points above stockpiles of about 510-and 1,000-cu. yd. capacities, respectively.

Minus ⅜-in. material passing the lower decks of all of the preceding four screens is fed to a pair of 6- by 12-ft. Allis-Chalmers Low Head screens. A 4-mesh separation is made here; ⅜-in. by 4-mesh pea gravel is dropped directly to a 625-cu. yd. stockpile, while the minus 4-mesh material is flumed to the adjoining sand plant. However, the pea gravel may be diverted through a flop gate onto an 18-in. by 72-ft. belt conveyor on which it is also carried to the sand operation.

The top two screens in the sizing plant and the "coarse" unit are supplied with wash water at the rate of 540 g.p.m. The fourth screen receives 360-g.p.m., while each of the two Low Heads is fed 180 g.p.m. Wash water is pumped from a clear ground-water fed reservoir (about 1 acre in area) that has a capacity, under normal conditions, of nearly 10,000,000 gal. A 3,500 g.p.m. float-mounted auxiliary pump rides with the water level and supplies a 3,500 g.p.m. Allis-Chalmers primary pump. When the water is at higher levels, the auxiliary is shut down; and the primary, driven by a 4,160-v. 300-hp. squirrel cage Electric Machinery motor, supplies the sizing and sand plants through a 14-in. line and over a 325-ft. head.

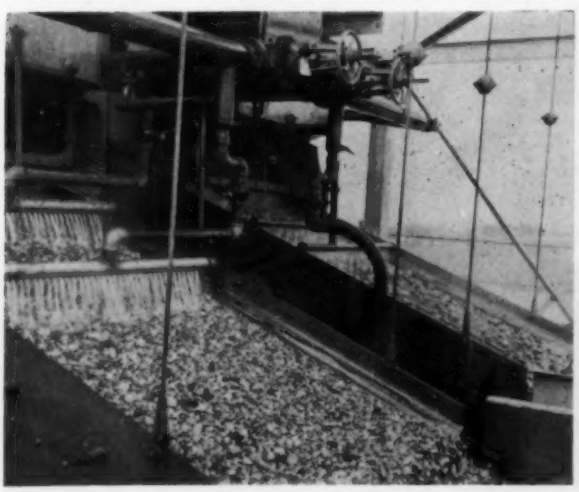
The six finished-aggregate stockpiles at the sizing plant have a total capacity of about 3,500 cu. yd. and are underlain by an 8-ft. 6-in. square cross section reinforced concrete tunnel, that houses a 30-in. by 265-ft. reclaiming conveyor. Two calibrated Jeffrey magnetic vibrating feeders, each of 200-t.p.h. capacity, below each pile transfer material to the reclaiming belt, which, in turn, transfers the aggregfiates to a 30-in. by 308-ft. inclined conveyor. At the top of a 72-ft. lift the various products are discharged to a 30-in. by 29-ft. 6-in. shuttle belt that distributes them to the appropriate sections of a 10-compartment bin structure mounted over two loading tracks.

At the sand plant the incoming minus 4-mesh material from the sizing plant is flumed to an Eagle Iron Works 32-ft. scalping tank. To overcome periodic deficiency of 30- to

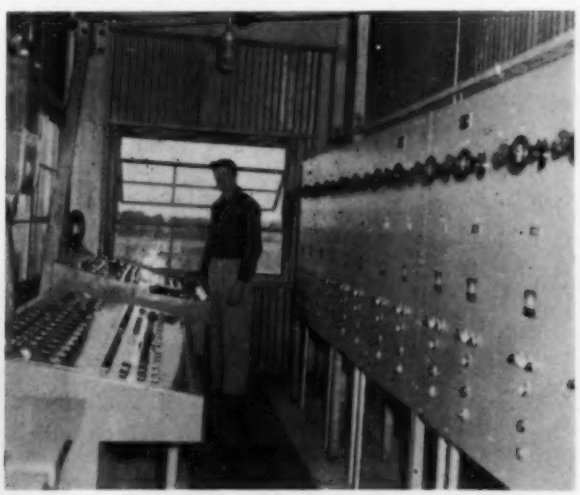


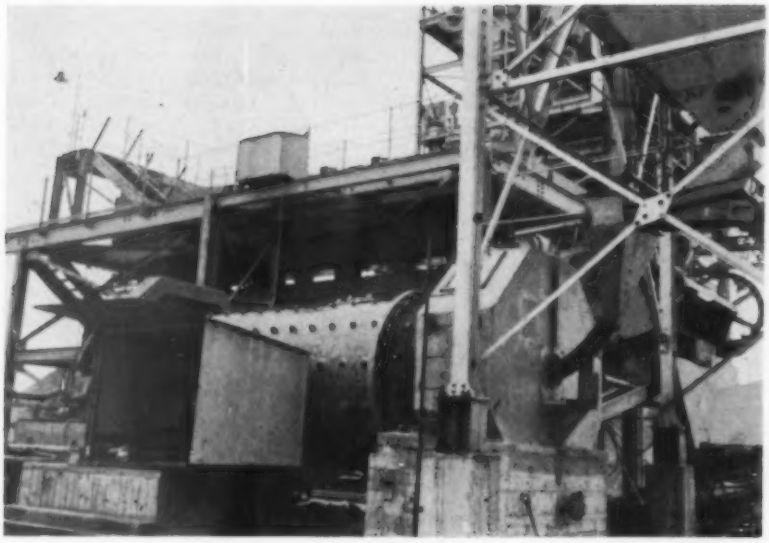
In this view of the washing and sizing operation, the enclosed control room is visible on the tower. Six sizes of finished aggregate are made here, while sand is processed in the smaller structure at left.

The two top screens in the washing and sizing tower, as well as the other four screens in the structure, are supplied with wash water.



With the panels shown here, one operator can control every section of the flow from the surge pile to the loading bins.





This 6- by 14-ft. rod mill is used to make up any deficiencies occurring in the range of 30- to 50-mesh material.

50-mesh sizes, pea gravel is transported to the sand plant as described above, and is discharged into a 50-ton capacity Butler surge bin, from which an Allis-Chalmers 6- by 14-ft. rod mill is supplied. A 25-t.p.h. calibrated feeder transfers the material from the bin to the mill, which has both a trunnion feed and discharge.

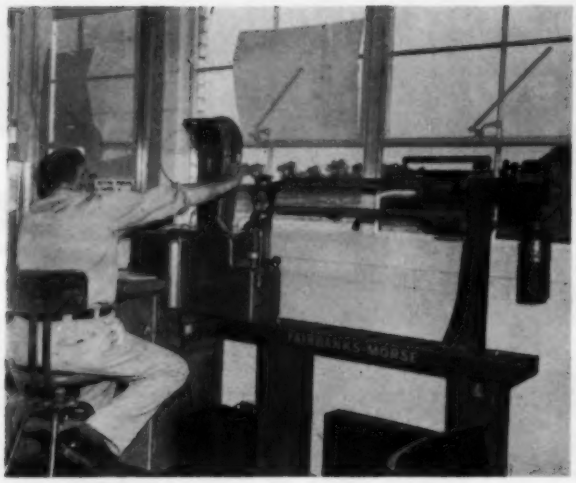
Driven at 20.8 r.p.m. by a 200-hp. motor, the mill is charged with 34 tons of 2- and 2½-in. rods 13-ft. 6-in. long. This unit is not regarded nor operated as a full-time production component, but is considered and used as a quality control unit for output of desired grades of sand. Approximately 35 t.p.h. of minus 35-mesh material is transferred from the mill by a 200-g.p.m. slurry pump to a 44-in. by 32-ft. Eagle Iron Works double-screw washer, where it joins the scalping tank product.

Provision has been made to bleed off up to 10 t.p.h. of material from the washer for recycling to the mill, in order to avoid loading up the latter with an excess of coarse ma-

Left: The 32-ft. scalping tank and the double screw washer used in sand production.

Below, left: A view below the loading bins. Trucks can be loaded as seen here under a railroad car loading gate, or by means of the side chutes on the right.

Below: Aggregates are delivered to this shuttle belt conveyor for distribution to their respective loading bins.



This equipment in the plant office handles weighing out of truck shipments.

The reinforced-concrete tunnel housing the reclaiming conveyor below the finished aggregate stockpiles. Two feeders under each pile deliver material to the belt for transfer to the loading bins.

terial. Overflow from both the scalping tank and the washer, along with surplus water from the primary pumping system, is transferred by a 3,000-g.p.m. Barrett-Haentjens pump to a settling pond. The latter was established by taking advantage of the natural terrain of the property, which provided a basin in a favorable out-of-the-way area. About 60 percent of the water used in the processing, after fines are settled out in the pond, is returned to the reservoir through a line in the barrier between the settling and clear water basins.

Sand discharge from the double-screw washer is received on a 24-in. by 51-ft. 6-in. belt conveyor and is carried to a 24-in. by 147-ft. radial stacker. The latter stockpiles the sand through a 180-degree arc in an area that can accommodate about 96,000 tons. A reclaiming tunnel below the stockpile is constructed of 108-in. diameter Armco liner sections, and is equipped with 10 manually operated draw down gates through which the sand is fed to a 24-in. by 346-ft. conveyor, In the present setup, approximately 5,400 tons of the overlying stockpile is active. This can be increased in the future by constructing another (connecting) tunnel.

Driven by a 40-hp. motor, the reclaiming belt has a speed of 400 f.p.m. and a capacity of 400 t.p.h. It carries the sand out of the tunnel and up a 59-ft. lift and discharges into a Butler turnhead chute above and at one end of the loading bins. From this point the sand can be distributed to any one of four end compartments.

Five Butler steel bins have been divided to form 10 compartments, each of which has a 150-cu. yd. capacity. With all compartments in the two rows above the loading tracks equipped with separate manually operated loading chutes, railroad cars can be loaded from any of ten points. Each of the five bins in one of the two rows also has, on the outer side, a hand-operated truck loading gate. It is also possible to load trucks by driving them under one line of rail loading chutes. Loading operations can be handled at the rate of 900 t.p.h. Only 5 or 6 seconds are required to fill a 12-cu. yd. truck and a little less than 60 seconds to load a 70-ton railroad car. Truck shipments are weighed out over a Fairbanks-Morse scale equipped with a Howe Weightograph.

The condition of each bin with respect to material content is indicated on the main control panel in the sizing plant. Not only do the Bindicator lights show a low or medium level, but when a bin has been filled to capacity, the flow of material to this particular bin is automatically stopped. The panel also carries the controls for all equipment from the surge pile to the loading bins, an arrangement which allows one operator to start or shut down the entire flow. Due to interlocking, the equipment cannot be started or stopped out of sequence. All operating units can be cleared of material and shut down in 12 minutes.

The high degree of flexibility in blending of materials is based on the design of the controlling system. Since each of the 12 Jeffrey vibrating feeders in the reclaiming tunnel under the aggregates stockpiles is calibrated to deliver a given quantity on predetermined amperage settings, the control room operator can blend any two or more of the six basic aggregates to furnish a product anywhere within the range of a particular specification.

Electric power for the plant is brought into the main transformer station at 33,500 kv. It is stepped down to 4,160 kv. and distributed to three substations which supply the three equipment circuits with 440 and 220. A set of indicator lights in the control room indicate shorting in any particular circuit by glowing with varying intensity.

Practically all of the belting used on the conveying system is a B. F. Goodrich product, and virtually all conveyor drives were furnished by Barber-Greene. The bulk of the electric motors installed are Reliance.

Bill Ledding, an "old timer" with Consumers Co., is superintendent of this new operation, which, with a crew of 10 to 15 men, has a highly efficient productive capacity and represents an excellent addition to the industry. Under the direction of Harry Clark, president of Consumers, company personnel who have played a large part in the development of the facility include R. O. Webster, general superintendent of gravel pits, Illinois division; T. E. Stone, who is in charge of production in pits and quarries of the Illinois division; R. J. Hummel, vice-president and general manager. C. E. Hogeboom, chief engineer; and L. Voltz, resident engineer on the project.

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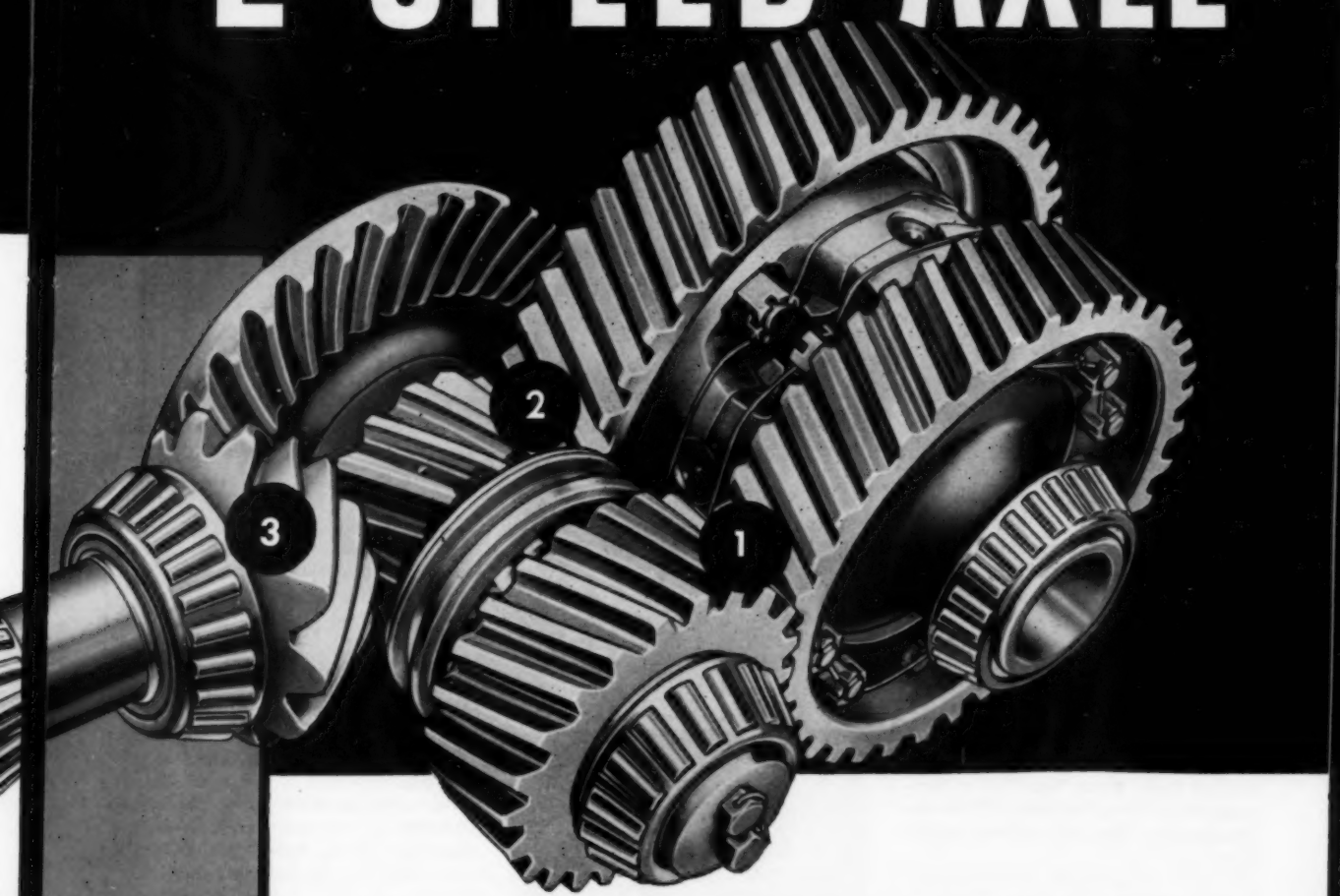

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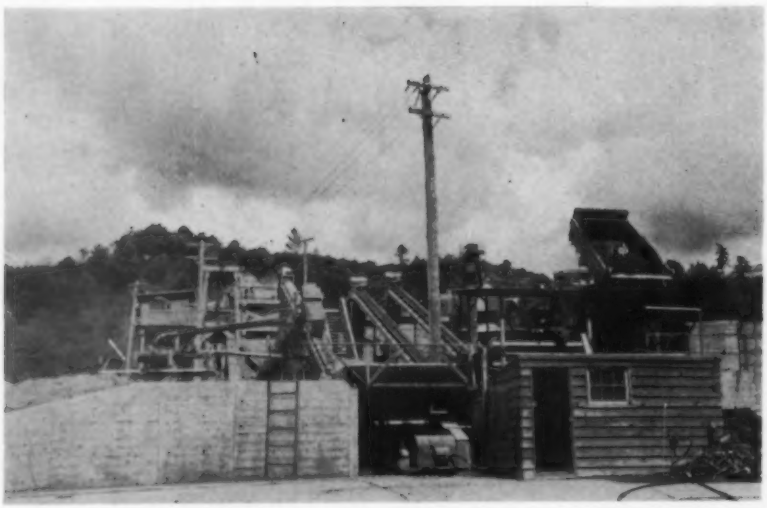
WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSES AND TRAILERS

Glacial Deposit Supplies Needed Fines To Supplement River Gravel

By HARRY F. UTLEY



Pit-run material is trucked up ramps and discharged into the receiving hoppers at the Stoneway Sand and Gravel operation near Seattle, Wash.

Another ON THE SPOT Report

TWO deposits, one the bed of a river and the other on the summit of a nearby glacial hill, are worked by one of the pioneer aggregates producers in the Seattle area, the Stoneway Sand and Gravel Company of Renton, Wash., in obtaining its raw material.

Seasonal conditions govern the excavating schedule to a great extent. The Cedar River deposit is worked from about April 15 to September 15, when turbidity is not objectionable. The hill deposit, at an elevation 175 ft. higher, is generally operated on full shift the remaining seven months of the year. There is considerable flexibility in this schedule, however, since needed fine sand for blending with the river-bed product comes from the higher deposit, which is also worked intermittently for 3- or 4-hour periods during the summer.

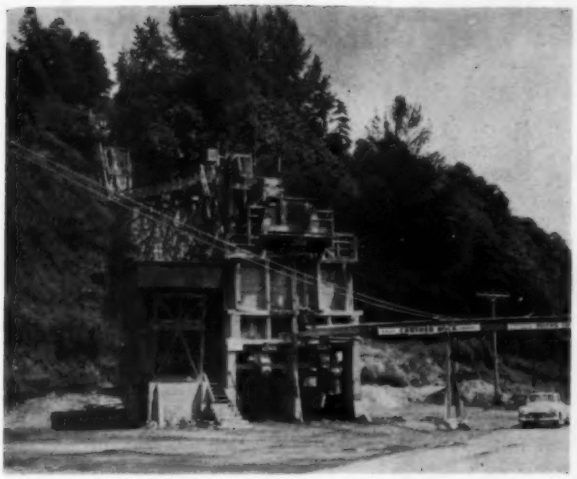
Capacity of the sand and gravel plan is about 150 t.p.h. About one-third of the product is sold, another third is utilized by the company for the production of ready-mixed concrete, and the remainder goes to an aggregate-bituminizing plant owned by an independent firm but operated on the Stoneway property.

In the hill pit, trucks discharge their loads to a glory hole, where water is added and the material is sluiced down by flume to gravity screens, which take out the sand before any further processing is done. Along the river, excavating is done by a Lorain No. 50 shovel equipped with a 1¼-cu. yd. bucket. The shovel loads dump trucks, which deliver to a hopper at the plant feeding the Cedarapids 4- by 12-ft. scalping screen. The plus 1½-in. fraction rejected at the scalping screen is carried away by conveyor and fed to a Kue-Ken 10- by 36-in. primary jaw crusher. A parallel conveyor carries the sand and minus 1½-in. gravel up to a tower for further processing. A separate ramp and hopper alongside the scalping screen receive sand (by dump-truck) from the hill deposit, which may be blended into the flow at this point.

Dispatcher at the station mike in the plant office can communicate by radio with most of the units in the truck-mixer fleet.

Two secondary gyratory crushers —a Kue-Ken 3-ft. unit and a Telsmith—reduce a sizable portion of the product to finely-crushed gravel, largely in demand by the asphalt plant. Final sizing and washing is done over a pair of Cedarapids 4- by 12-ft. screens, a Simplicity 3- by 6-ft. double-deck screen closing the circuit on the gyratory-crusher side. Finished products drop into three compartmented truck-loading bins. Both 100 percent crushed and blended products are made and stored; and, when necessary, the plant can convert to a straight crushing operation for the exclusive production of unwashed road-base material.

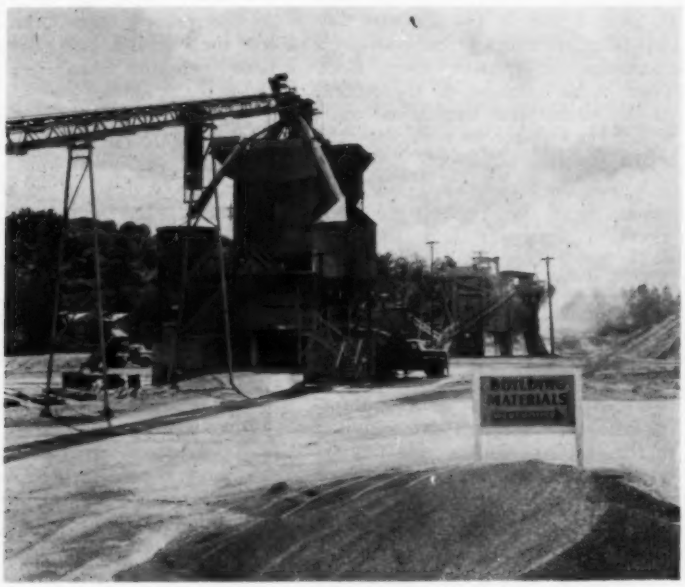
The concrete plant is supplied with aggregates by dump trucks which empty into a hopper feeding (by gate) a 240-ft. inclined belt conveyor to the Butler bins. Noble scales and batching equipment weigh out the sand, gravel, and cement. Bulk cement is obtained from the Diamond plant of Superior Portland Cement, Inc., in Seattle and is transported by Stoneway's own special truck-trailer unit. The concrete plant is equipped either for straight



A flume carrying material downhill from the high-level pit discharges to gravity screens above the truck-loading bins. After the initial separation it is trucked to the main plant across the road.

The scalping screen and conveyors which carry screen rejects and throughs to the crushing, washing, and sizing departments. Fine sand is also blended in from the small hopper at the extreme right.

Finely crushed gravel is produced by this 3-ft. gyratory machine.



This view shows the concrete plant and the aggregate washing-and-screening building (background).

batching into truck-mixers or for pre-mixing, before it enters the drums, *via* a Rex 2-cu. yd. mixer. (Seattle and Renton building codes require concrete to be pre-mixed for most concrete work, subject to municipal inspection.)

The company operates a fleet of 19 truck-mixers composed of Rex, Challenge, and TransCrete units. Most of these have now been 2-way-radio equipped. An R.C.A. transmitter and R.C.A. mobile equipment operate over a "citizens' band" wave length. The main tower is on a hill about 4 miles distant, and transmission from plant to the tower is by way of a leased telephone circuit. The company claims the distinction of being the first ready-mix concern in the Seattle area to modernize its dispatching and communications facilities by the use of mobile radio.

Stoneway has been in the business of producing aggregates since 1927 and was originally known as the Stoneway Dock Co. Its founder and president, George Hardenbergh, passed away in June 1955, at the age of 79. L. J. Dowell, who joined the concern three or four years ago after 30 years in the contracting business in Seattle, is now president and general manager.

New Flintkote Plant in Texas Part of $20,000,000 Expansion

As a part of a $20,000,000 expansion program, the Flintkote Company, Lockport, N. Y., will build a modern gypsum producing plant at Sweetwater, Tex., to manufacture gypsum board, plaster, and other gypsum materials for building construction.

Flintkote has acquired a large deposit of gypsum at the Texas site, and will begin construction of the plant soon. The new facility is expected to be in production in 1957, according to E. E. Johnston, manager.

ACP, Soil Bank, Regional Problems Discussed at

N. A. L. I.

Mid-Year Board Meeting

Another ON THE SPOT Report

DURING the recent mid-year meeting of the National Agricultural Limestone Institute's board of directors, a number of subjects of timely importance and interest to the industry were taken under discussion. Sessions were held at the Chase Hotel, St. Louis, Mo., on June 4 and 5. On the first day individual meetings of the institute's numerous committees were held. These were followed on the second day by submittal of the various committee and other reports to the board in general session.

Among the topics taken under discussion were the Agricultural Conservation Program and the Soil Bank, percentage depletion, promotion and advertising, and regional problems with respect to ASC regulations.

Leonard S. Fry, Fry Coal & Stone Co., Mercersburg, Pa., N.A.L.I. president, opened the general meeting with remarks on the activities of the last six months. He pointed out that considerable time had been taken up with hearings on the Soil Bank and the ACP, and in discussions with numerous congressmen on those subjects. As a result of the attention required by that activity in Washington, it was stated that it was possible for officers and staff members to participate in only two state meetings of agricultural and industry groups. Mr. Fry also noted that while there had been a decline in the use of sales circulars, outlets for N.A.L.I. news releases had been increased from over 2,800 to more than 3,200.

Along with his mid-year report, Robert M. Koch, N.A.L.I. executive secretary, explained the new proposed regional setup to the board members. The new regions were marked out to conform with those of ACP which it was suggested would greatly aid liaison between N.A.L.I. regional officers and those of ACP.

In commenting on ACP, Mr. Koch noted that revisions in the program as established at the Washington level on the matter of relaxing restrictions are currently showing more benefit in the field, as evidenced by the use of amounts of the funds appropriated. It was pointed out that while benefit to the industry hit its lowest point two years ago, an increase in soil conservation efforts with a parallel increase in federal assistance in the agricultural field presents a brighter picture.

The executive secretary stated further that a $250,000,000 ACP appropriation had been established for 1956 and 1957 and that the budget appropriation for 1958 is now being worked on. He called attention to the fact that there will be no great immediate benefit to the agricultural limestone industry resulting from the Soil Bank, inasmuch as only part of the $450,000,000 allotment for conservation of farm acreage will find its way into liming practices. The Soil Bank bill, it was noted, contains a provision that allows farmers to lease idle farm land to the government; and when such procedure is followed, there would probably be no liming of that acreage. Mr. Koch pointed out, however, that there will undoubtedly be further legislative activity on the Soil Bank next year.

With respect to an increase in

R. M. Koch, N.A.L.I. executive secretary; Ernest Miller, N.A.L.I. Washington staff; L. S. Fry, Fry Coal & Stone Co., Mercersburg, Pa.; and J. J. Griesemer, Griesemer Quarry, Springfield, Mo.

Among those attending an evening social gathering were A. E. Markgraf, Pontiac Stone Co., Pontiac, Ill.; Mrs. E. D. Werner; and E. D. Werner, La Mar Stone Co., Princeville, Ill.

the payment rate in cost-sharing of conservation practices, it was stated that no progress had been made in establishing an 80 percent rate. Along the same line, Mr. Koch pointed out that in areas where a 75 percent share is borne by the government, a favorable effect has been realized in the number of lime orders.

The executive secretary introduced to the board members a new member of his Washington staff, Ernest Miller, who recently joined the organization. Mr. Miller brings to his new post a background of five years' experience with a county ASC office in North Carolina.

With a number of revisions in the N.A.L.I. by-laws brought about by a thorough review of that material in committee session, all changes recommended by the committee (except one which is to be referred to counsel) were accepted by the board. The latter unanimously commended the committee and its chairman, W. H. Litteer, General Crushed Stone Co., Watertown, N. Y., for a job well done.

Russell W. Hunt, Southwest Lime Co., Neosho, Mo., chairman of the state associations committee, recommended that N.A.L.I. members make a neffort to meet with state and government agricultural and conservation officials during regional gatherings of the latter. Along this line, Robert Koch noted that the two Northeast area meetings this year had provided an excellent opportunity for informal discussion among national and state officials on the problems of field administration. It was suggested that N.A.L.I. regional vice-presidents could provide a service by acting as hosts for informal gatherings during ASC regional meetings. The subject received favorable comment from the members in attendance, along with an indication that the regional vice-presidents would take steps to follow this suggestion. Financing of such meetings, it was pointed out, should be borne by the particular region concerned and not by the N.A.L.I. budget.

The chairman of the convention arrangements committee, L. R. Falk, L. R. Falk Construction Co., St. Ansgar, Iowa, presented the committee's two recommendations for the site of the mid-1957 board meeting. The Edgewater Beach Hotel, Chicago, was selected, with a tentative meeting date falling in the latter part of June. The committee also suggested that the 1958 convention, as well as all following annual national gatherings of this association, be held in Washington, D. C.

E. C. Farrar, American Cyanamid, Latrobe, Pa.; S. Kraus Jr., Auxvasse Stone and Gravel Co., St. Louis, Mo.; Mrs. S. Kraus Jr.; Mrs. Samuel Kraus Sr.; E. M. Markwell, and Samuel Kraus Sr., also of the Auxvasse organization.

Kenneth W. Horne, Limestone Products Corp. of America, Newton, N. J., acting chairman of the percentage depletion committee, reported that while there was no specific legislative activity in that area and no regulations had yet been promulgated on the 1954 statute, adjustments now under consideration in the Treasury Department will provide for allowing fiscal year operators a deduction covering that part of 1954 which would otherwise be lost to them.

In presenting the membership committee's report, the chairman, W. Stone, Piqua Quarries, Piqua, Ohio, stated that his group was proposing to send out a series of four letters to nonmember producers. These will contain a brief but direct message concerning the advantages of association with the N.A.L.I. and a background presentation of the activities of this group. It was noted during the session that, as of the end of 1955, there are approximately 400 members in the Association.

A combined report for all five regions was presented by Herbert Gray. It was pointed out in the report that some of the apparent causes for the inadequate use of lime included the laxity in promotion on the part of local county offices during the last two years; red tape which called for submission of soil samples and fertilizer history by farmers; restrictions which provide that in some areas afarmer shall apply various other fertilizers in order to obtain cost-sharing on lime; and inadequacy of testing methods and equipment.

Mr. Gray presented the regional groups' recommendations for correcting the above weaknesses, as follows: eliminate the mandatory soil test or relax it to allow the minimum tonnage provision; eliminate the mandatory use of other fertilizers as a condition for obtaining ASC lime; work toward raising federal assistance to 70 or 80 percent; and take steps to correct hte lethargy and complacency shown by many individual producers and state lime associations.

Due to resignations and the new regional setup, Leonard Fry, chairman of the nominating committee placed the following names in nomination for the post of director: Powell G. Potts, Southern Stone Co., Franklin, Ky.; Charles H. Krause,

(*Continued on page* 189)

Industrial Hygiene Foundation Publishes History of Service

To mark the completion of its 20th year of service to industry in the field of occupational health problems, the Industrial Hygiene Foundation has published a bulletin entitled *History of Industrial Hygiene Foundation.*

The Foundation's technical staff assists its member companies in the solution of specific industrial health problems through field studies and research and renders service in the establishment, expansion, and conduct of medical programs in industry.

This new publication may be obtained from the Industrial Hygiene Foundation of America, Inc., Mellon Institute, 4400 Fifth Avenue, Pittsburgh 13, Pa.

Allis-Chalmers Unveils Pilot Model Of ACL Traveling Grate Kiln

Another ON THE SPOT Report

AT a press showing on May 28 the Allis-Chalmers Manufacturing Company unveiled a new pilot plant built for the purpose of testing, demonstrating, and developing untried raw materials and new techniques in cement making with the ACL traveling grate process. The pilot plant is located at the company's heat processing laboratory at Carrollville, Wis., 15 miles south of downtown Milwaukee.

The ACL system represents an important milestone in the development of the cement industry. Essentially, the process consists of three parts — a pelletizing operation, a traveling grate for drying and partially burning the pellets, and a short kiln for final burning. However, the ACL system takes up only a little more than half the space of conventional units. It features uniform pellets from raw material to finished clinker; and the lowest fuel consumption and dust loss of any rotary kiln cement process known in the world today is claimed.

This ACL pilot plant plus the company's Research Division facilities now enable Allis-Chalmers engineers to duplicate every stage of manufacturing cement, from the grinding of raw materials to the fine-grinding of finished cement.

The ACL traveling grate replaces what is normally referred to as the feed end section of a conventional kiln. The grate enclosure is divided into two sections — the drying and pre-burning chambers. The pellets first enter the drying chamber, where they are exposed to a downdraft flow of gases which dry the pellets uniformly and are then exhausted to atmosphere.

Next the pellets enter the pre-burning chamber, where they are exposed to a downdraft of hot kiln exit gases. Here the pellets are partially calcined and become hard before entering the feed end of the rotary kiln.

It is this double pass of the gases through the pellet bed that results in the extremely low dust loss without additional dust collectors. The second pass of gases occurs in the drying chamber, where they come in intimate contact with moist pellets, which effectively removes the dust. Dust loss in the ACL system is said to be less than 10 percent per weight of feed.

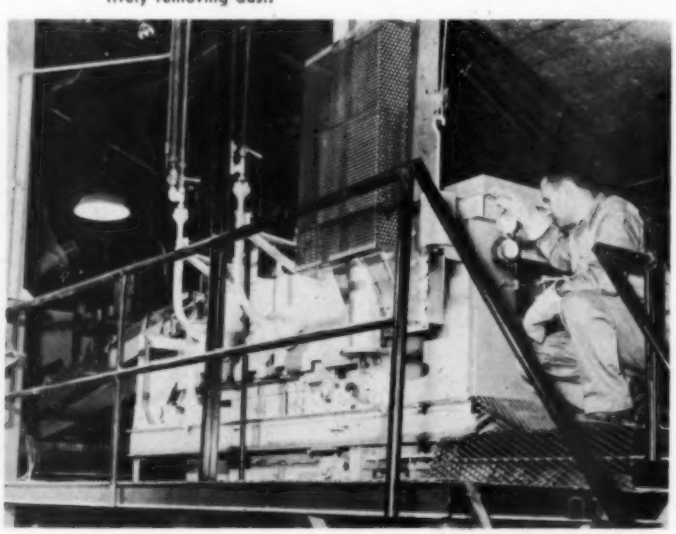
Pellets are produced in a pan-type pelletizer preceding the ACL grate. Dry finely ground raw material is converted into ¼- to ⅞-in. pellets by the addition of 12 to 14 percent of water. The pelletizer has a slope of about 60 degrees and rotates at about 12 r.p.m. A short conveyor delivers the pellets to the grate feed hopper, from which they are fed onto the traveling grate in a layer about 6 in. deep. The height of this pellet bed is controlled by an adjustable cut-off plate across the width of the grate, following the feed hopper.

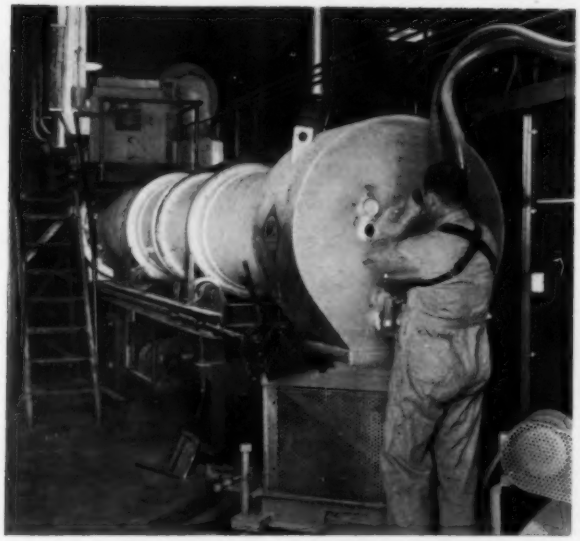
Essentially, the ACL grate consists of a slow-moving traveling conveyor, made up of chain and castings (similar to a stoker grate). The grate enclosure is divided by baffles into two sections, the drying and pre-burning chambers.

The pellets first enter the drying chamber of the ACL traveling grate, where they are exposed to a downdraft flow of relatively cool gases that enter at a temperature of 500 to 600 degrees F. Here the pellets are dried uniformly, so there will be

Pan-type pelletizer designed for the ACL system by Allis-Chalmers engineers. Note the uniformity of the pellets being discharged onto the belt which carries them to the ACL traveling grate. The proportions of the blended raw mix cannot vary anywhere in the system after they are locked in pellet form, thus preventing segregation of the finely-ground raw material.

The ACL traveling grate. The operator is looking through an inspection port into the pre-burning chamber, where partially burned pellets are discharged into the rotary kiln directly below operator. The pellets enter at the left, going through the drying chamber first, where kiln exit gases pass through the pellet bed for the second time, effectively removing dust.





Checking the burning zone temperature of the ACL pilot plant kiln with an optical pyrometer. Capacity of this pilot system is 300 to 400 lb. per hour. At the far end of the kiln is the ACL traveling grate. The ACL system pelletizes the feed, locks together the components of the blended raw mix, and prevents segregation. The pellets remain uniform throughout the system, minimizing "flushing" in the kiln and producing more uniform burning conditions.

no moisture in the pellets when they reach the preburning section of the grate. This is the second pass of kiln exit gases through the pellet bed, which reduces their temperature to 200 to 250 degrees F. as exhausted to atmosphere.

Then the pellets enter the preburning chamber of the ACL grate, where they are exposed to hot kiln exit gases at temperatures from 1,700 to 1,800 degrees F. Here the pellets are partially calcined(25 to 35 percent) and are "heat hardened" before they enter the feed end of the kiln. This is the first pass of kiln exit gases through the pellet bed.

The final calcining and burning of the cement clinker then is accomplished in the rotary ACL kiln. The hot clinker discharging from the kiln (still in the form of pellets) is then cooled to recover heat and to facilitate further processing. The resultant clinker is then ground and packed in the same manner as at any conventional cement plant.

The new pilot plant is the world's smallest ACL system, having a production rate of about 300 to 400 lb. per hour, or about 1 bbl. per hour. This compares to a standard commercial ACL unit which varies in capacity from about 60 to 175 bbl. per hour (1,500 to 4,200 bbl./day).

The pilot ACL system is complete from the feeding system for dry finely-ground raw material to the cooling of the clinker discharging from the kiln. This pilot installation has the following flow of material:

The barrels of raw mix are dumped into the feed box, beneath which a screw conveyor takes the raw mix to the feed elevator. The latter delivers material to a small overflow-type feed bin above the rotary feeder for the pelletizer. Overflow from the small bin returns to the large feed bin, from which it is constantly recirculated in the screw conveyor-elevator-overflow feed bin circuit.

The pelletizer operator controls the rotary feeder to give the proper feed rates to the pan-type pelletizer, This device is 3 ft. 3 in. in diameter by 12 in. deep and is equipped with moving scrapers which keep the bottom plate and the sides free from build-up of raw material. The pan pelletizer has four variables which can be controlled to give the proper size pellet with the correct moisture content. These variables are (a) slope, (b) speed, (c) feed rate, and (d) water rate.

The pellets discharge to a short inclined belt conveyor which transports them to the feed box of the ACL grate. The grate is 18 in. wide by 5 ft. 6 in. centers, and is divided into drying and preburning sections, the same as a commercial size unit. From the grate, the partially calcined pellets are fed into the pilot ACL kiln, which has a 31-in. inside diameter and is 18 ft. long. The actual diameter of this kiln inside the refractory lining is about 18 in. The clinker discharging from the kiln is cooled by a special rotating vertical cooler, which was designed specifically for this pilot plant.

Draft and temperature conditions throughout the system are measured on the master kiln control panel, located near the kiln discharge end. Gas flow to the burner is also measured. (Propane gas is used to fire this pilot kiln). Coal, oil, or natural gas can be used for firing commercial ACL systems. A separate panel (located near the pelletizer) has been provided to control all equipment up to and including the pelletizer.

Several successful test runs have already been made on material now being used for cement production at one customer's plant. Fuel consumption of about 700,000 B.t.u.'s/bbl. has already been recorded for this pilot installation. The resultant clinker has been analyzed by the customer's laboratory and has been pronounced a high quality cement.

N.A.L.I. Board Meeting

(*From page* 187)

Columbia Quarry Co., St. Louis, Mo.; R. T. Willingham, Willingham-Little Stone Co., Atlanta, Ga.; Ed Conklin, Conklin Limestone Co., Inc., Saylesville, R. I.; and L. R. Falk, L. R. Falk Construction Co., St. Ansgar, Iowa. Nominees for vice-presidency of regions 4 and 5 respectively, were: W. L. Bryan, Bryan Rock Products, Inc., Shakopee, Minn.; and E. B. Snead, Texas Crushed Stone Co., Austin, Tex.

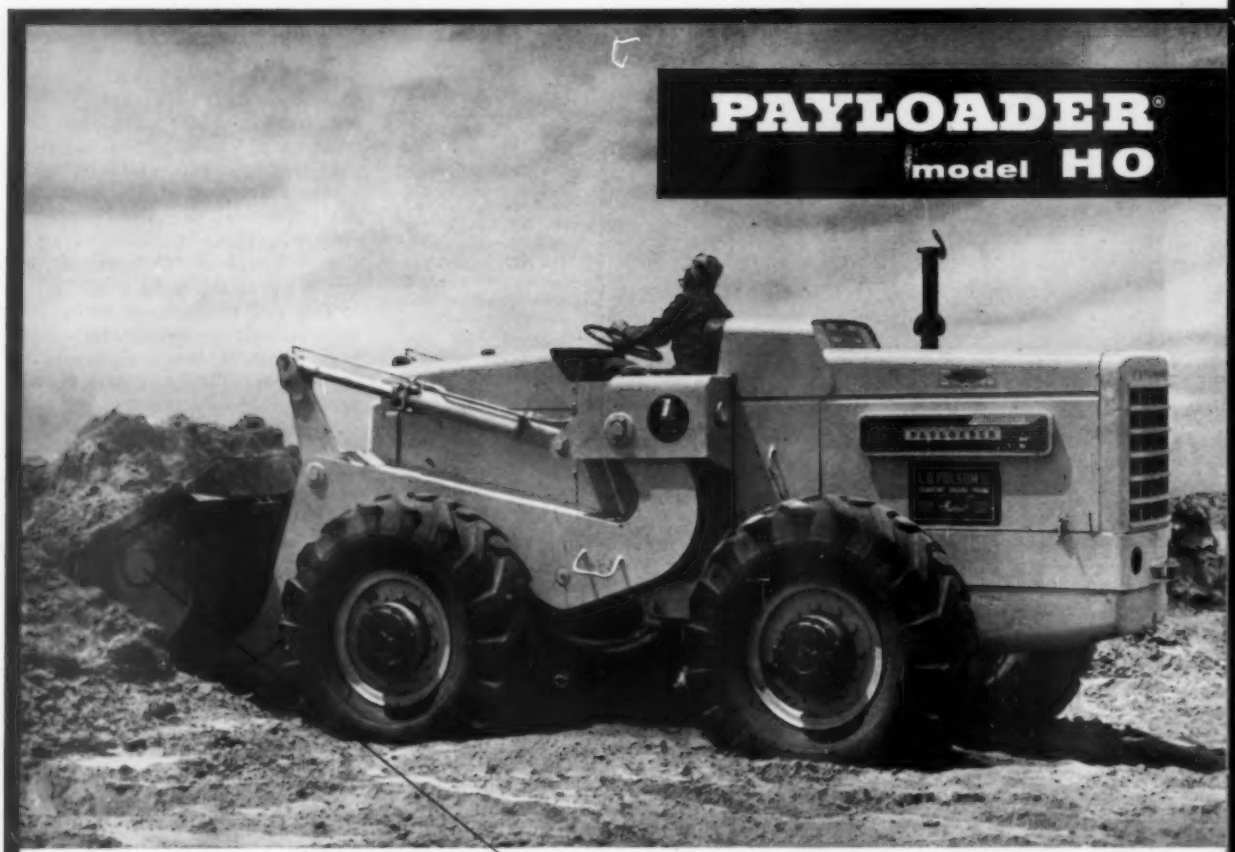
The N.A.L.I. election procedure requires that a nominating committee composed of the president, five regional vice-presidents and one director from each of the five regions shall nominate 20 men to replace the one-third of the board members whose terms expire each year. The board elected the following five to serve from their number on this committee: C. A. Munz, J. B. Mount, W. E. Stone, H. C. Gray, and Raymond Hopper.

This committee will submit its nominations to the entire membership, and election will be by mail. The 20 elected will begin their three-year term of office at the board meeting to be held in Washington on January 20 prior to the annual convention.

General Refractories Co. To Build Gary, Ind., Plant

Officials of the General Refractories Company, Philadelphia, Pa., recently announced plans for the construction of a new basic refractory brick manufacturing works at Gary, Ind. The plant has been designed to allow for extensive expansion to keep pace with increasing demands for its products throughout the Midwestern industrial area.

At the Gary Works, General Refractories will manufacture its complete line of chemically- bonded basic brick, including its Steelklad and Ritex brands.



more yards per load

Gets More

A combination of powerful "pry-out" action using breakout pads as a fulcrum for leverage and a 40° bucket tip-back *at ground level* gets BIGGER LOADS with less spillage.

Keeps More

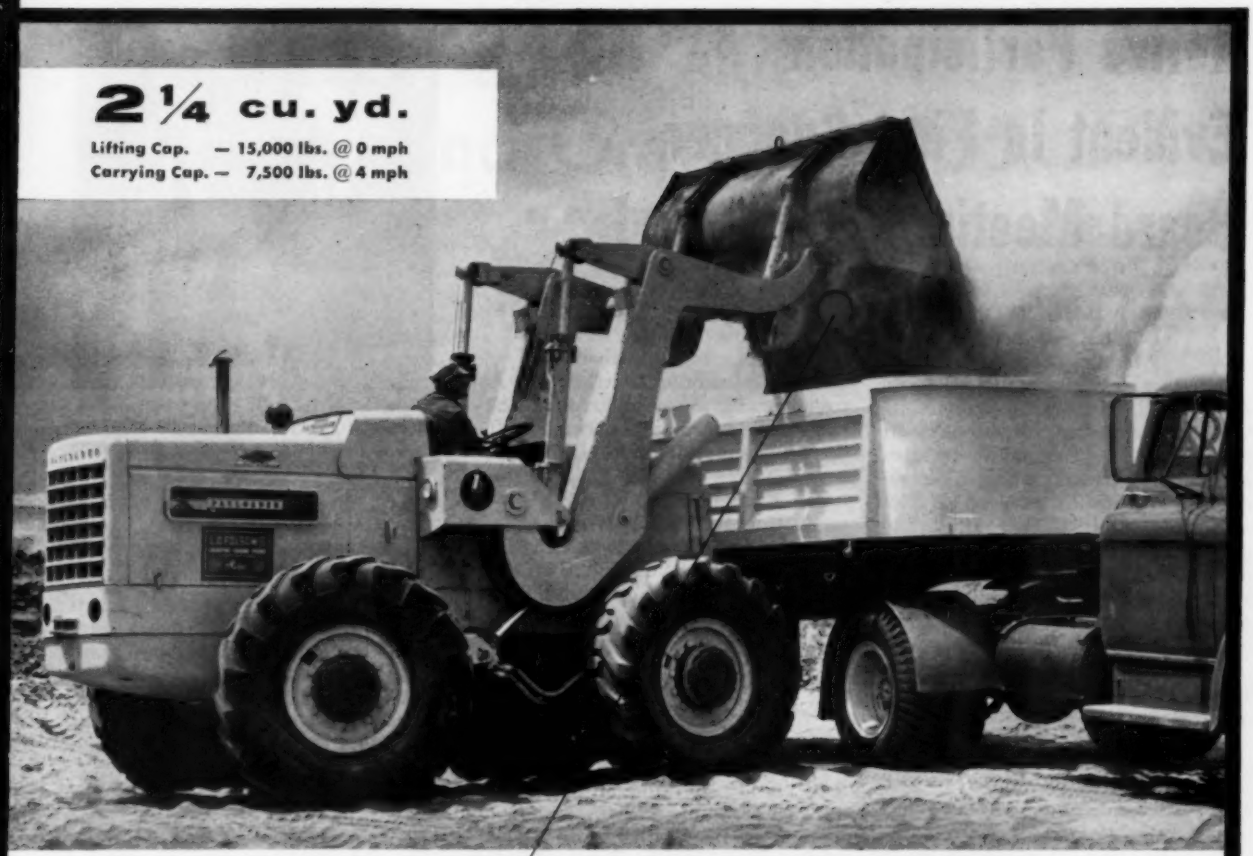
Heaped loads are cradled closer and lower for greater stability while carrying. Hydraulic system shock-absorber also cushions the load, smooths the ride, and permits faster movement with less spillage.

Delivers More

Since you get MORE to begin with and keep MORE while traveling at higher speeds . . . with less spillage in both instances . . . the result—you *deliver* more yards per load and more loads per hour.

The new model HO is the finest four-wheel-drive tractor-shovel ever offered. It has *everything* that has proven desirable in modern tractor-shovel design, including important new and exclusive features: torque-proportioning differentials; no-stop power-shift transmission; powerful 40-degree bucket break-out action; "stay-clean" hydraulic system; greater dumping height and reach; longer wheelbase; shorter length while carrying.

This big "PAYLOADER" operates easier and faster and rides smoother, with or without a load, than anything near its size. It has *balanced* design and durability throughout to turn out big production day after day. If you want proof of its *productive capacity* and superior *performance,* ask your "PAYLOADER" Distributor for a demonstration.



more loads per hour

Loaded with "more-yardage" features

- **Torque proportioning differentials** — an exclusive "PAYLOADER" feature—increase effective traction. If one wheel begins to spin because of poor traction, more power is delivered automatically to the other wheel.
- **"No-stop" power-shift transmission,** with torque-converter, can make ALL shifts on-the-go under full engine speed. There's no stopping for a range shift and no "clutching". Operator can "inch" the machine with forward-reverse control while maintaining full engine speed to provide maximum bucket lifting and dumping power.
- **All-power control** also includes power brakes on all wheels, and power steer to further reduce operational fatigue and promote full production all day.
- **Rugged planetary final drives** in all wheels, plus hypoid differential gearing keep torque low in axles—prolong life of drive train parts as well as axles.

Safety and Stability

The safest and most stable wheeled tractor-shovel ever built. Moving members cannot injure operator because of underslung boom arm design and positioning. With loads carried lower and closer to the machine, cushioned during travel, and with longer wheel-base the utmost in stability is achieved.

PAYLOADER®
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THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
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Send information on "PAYLOADER" tractor-shovels:

☐ model HO	☐ model HH	☐ model HU
2¼ cu. yd. heaped, 1¾ cu. yd. struck	1¾ cu. yd. heaped, 1½ cu. yd. struck	1 cu. yd. heaped, ¾ cu. yd. struck

Name_____
Title_____
Company_____
Street_____
City_____ State_____

Active Participation Evident In First Summer Board Meeting of N. C. L. I.

By BUREN C. HEROD

Another ON THE SPOT Report

A MILESTONE in the progress of a healthy young organization was recently passed when the board of directors of the National Crushed Limestone Institute held their first mid-year board meeting on June 5 and 6 at the Chase Hotel in St. Louis, Mo. That this new group is one with a high potential was evident from the interest and spirit of co-operation displayed by the members attending.

Under the direction of J. J. Griesemer, Griesemer Quarry, Springfield, Mo., N.C.L.I. president, the various committees met in general session on Tuesday evening. A general board session was held the following day to discuss committee reports and other subjects of interest to the group. Among these were membership, highway legislation, percentage depletion, and arrangements for the annual convention next January. After opening the session, Mr. Griesemer introduced to the members the first vice-president of N.C.L.I., C. A. Broecker (Newton County Stone Co., Kentland, Ind.).

Arthur R. Alvis(Alvis Limestone and Concrete Products, Butler, Mo.), chairman of the convention arrangements committee, reported that the next annual N.C.L.I. convention will be held in Washington, D. C., during inaugural week. It was tentatively proposed to hold the meetings of the several committees on Monday, January 21, and the open session on Thursday, January 24, following the two-day N.A.L.I. gathering.

Leonard Fry (Fry Coal & Stone Co., Mercersburg, Pa.), N.C.L.I. director and N.A.L.I. president, extended a welcome to the group and their guests to join N.A.L.I. at its banquet on the evening of January 23. Mr. Fry suggested that guest lists for that affair be turned in by N.C.L.I. members as early as possible.

Robert M. Koch (executive vice-president, N.C.L.I., Washington, D. C.), and Russell W. Hunt (Southwest Lime Company, Neosho, Mo.).

In reporting on the financial status of N.C.L.I., J. B. Mount (Maymead Lime Co., Shouns, Tenn.), finance committee chairman, stated that the association is in good shape, particularly so in view of its recent inception.

Robert M. Patton (New York Coal Co., Columbus, O.), chairman of the membership committee, stated that at this time there are more than 150 producers pledged to membership or known to have indicated intentions of so doing. Mr. Patton noted, however, that the potential membership which could be built up through acquainting non-member producers with the possibilities of this association has not yet really been approached. Mr. Griesemer added that each member of the board would give a membership drive considerable impetus by aiding the campaign in his particular area.

Following the suggestion of H. C. Wolfe (Wyandot Dolomite Inc., Carey, Ohio) that board members should organize state meetings to aid in the drive for more members, it was pointed out that it would do well to concentrate on many of the smaller producers for whom much of the federal legislation affecting the industry holds the greatest potential benefit.

With respect to percentage depletion, Thomas E. Lalley (Bradford

(*Continued on* page 194)

N.C.L.I. officers and directors who attended the recent mid-year meeting. Front (left to right): Arly H. Brooks (Brooks Quarry, Kahoka, Mo.); Floyd H. Millen (Valley Limestone and Gravel, Farmington, Iowa); Robert M. Koch, executive vice-president; Taisto Laine (Hanna Coal Co., Adena, Ohio), treasurer; J. Griesemer (Griesemer Quarry, Springfield, Mo.), president; C. A. Broecker (Newton County Stone Co., Kentland, Ind.), first-vice president; Paul W. Seitz (May Sand & Gravel Corporation, Fort Wayne, Ind.); and J. B. Mount (Maymead Lime Company, Shouns, Tenn.).
Rear row (left to right): Robert M. Patton (New York Coal Company, Columbus, Ohio); E. B. Snead (Texas Crushed Stone Co., Austin, Tex.); Thomas E. Lalley (Bradford Hills Quarry, E. Petersburg, Pa.); Leonard S. Fry (Fry Coal and Stone Co., Mercersburg, Pa.); Arthur R. Alvis (Alvin Limestone and Concrete Products, Butler, Mo.); Merrill M. Green (M. M. Green Quarries, Carrollton, Mo.); L. R. Falk, Falk Construction Co. (St. Ansgar, Iowa); and H. C. Wolfe (Wyandot Dolomite Inc., Carey, Ohio).

Production and Value Of Sand and Gravel in 1955

By KENNETH E. TOBIN JR.
Associate Executive Secretary
National Sand and Gravel Association

THE third annual survey of the production and value of sand and gravel was recently completed by The National Sand and Gravel Association. This survey is designed to fill the need for a current measurement of the contribution which the sand and gravel industry makes each year to the national economy. The United States Bureau of Mines, which has not yet released its *1954* report on sand and gravel, has failed to publish the annual data on our industry in time to give it more than historical value.

Questionnaires were sent to the 1,657 sand and gravel companies in the United States of whom we have record. Returns were received from 565 companies, operating 909 plants. In addition to receiving returns from 565 companies, production statistics were also available for 41 member companies who did not return the questionnaire. These statistics have been incorporated in the study wherever possible, making a total participation of 606 companies.

Table 1 shows that the reporting companies produced 205,553,878 tons, valued at $215,056,555, or an average value of $1.05 per ton. Accurate comparisons with the Bureau of Mines statistics for 1953 are not feasible because participation in our survey was not as large and, further, the Bureau's statistics include government-and-contractor production as well as approximately 18,000,000 tons of industrial sand production, which we excluded from our survey. Included in Table 1, however, is a comparison with the data developed in our 1954 survey in which 533 companies, operating 878 plants, reported a total production of 186,844,448 tons of sand and gravel, at a value of $196,344,138, or an average value of $1.05 per ton. Also included are comparable statistics from our 1953 survey.

The average production per reporting company was 380,631 tons, compared with an average production per company of 337,874 tons reported for 1954. Average production per plant in 1955 was 236,586 tons, as compared with 212,807 tons in 1954. The reporting companies produced 95,210,450 tons of sand valued at $90,053,558, an average value of $.95 per ton, and 110,343,428 tons of gravel, valued at $125,002,997, an average value of $1.14.

The totals reported in Table 1 do not include data from the 41 member companies which did not return our questionnaire, but whose production figures were otherwise available. The total sand and gravel produced by these companies in 1955 was 10,726,316 tons. Therefore, the total commercial production for which we can account in 1955 was 216,280,194 tons.

Table 2 is an analysis of the methods of transportation employed by the sand and gravel industry for shipping its product in 1955. Included for purposes of comparison are data from our 1954 survey. Trucks continue to carry the greater part of sand and gravel tonnage, accounting for 128,782,913 tons, or 62.7 percent of the reported production, as compared with 60.6 percent of the production reported in our 1954 survey. Railroads transported 50,133,301 tons, or 24.4 percent of the total production. This was a slight decrease from the 25 percent shipped by rail in 1954. Water transportation accounted for 18,189,526 tons of sand and gravel, or 8.8 percent of the reported production. This was a decrease of 2.7 percent from the 11.5 percent of production transported by water in 1954.

Table 3 summarizes the consumption of sand and gravel in 1955. The heavy construction industry (industrial buildings, highways, streets, etc.) consumed 86,389,305 tons, or 42 percent of the reported total. This represents a slight increase in the percentage of consumption for heavy construction as reported in 1954. The ready-mixed concrete industry was the second-largest purchaser of sand and gravel, using 65,085,531 tons, or approximately 32 percent of the reported production. This is approximately the same percentage of consumption for ready-mixed concrete reported in 1954.

Sizeable quantities of sand and gravel were also used for concrete products and railroad ballast. Almost 14 percent of the total production was sold through dealers, and the ultimate consumer is not identified for that tonnage.

Table 1—Sand and Gravel—1953, 1954 and 1955

	1953	1954	1955
Production:			
Sand (tons)	75,660,683	84,164,624	95,210,450
Gravel (tons)	86,796,780	102,679,824	110,343,428
Total (tons)	162,457,463	186,844,448	205,553,878
Value:			
Sand	$ 69,326,359	$ 80,995,278	$ 90,053,558
Gravel	93,336,879	115,348,860	125,002,997
Total	162,663,256	196,344,138	215,056,555
Average value per ton:			
Sand	$ .92	$ .96	$ .95
Gravel	1.08	1.12	1.14
Total	1.00	1.05	1.05
Companies surveyed	1,710	1,691	1,657
Companies reporting	412	553	565
Number of plants operated by reporting companies	661	878	909
Average production per reporting company (tons)	394,314	337,874	380,631
Average production per reporting plant (tons)	245,775	212,807	236,586

1955 totals do not include 41 member companies which did not return our questionnaire, but whose total production of 10,726,316 tons of sand and gravel was otherwise available.

Table 2—Methods of Transportation of Sand and Gravel in 1954 and 1955

Type of Transportation	1954 Short Tons	1954 Percent of Total	1955 Short Tons	1955 Percent of Total
Truck	113,255,553	60.6	128,782,913	62.7
Rail	46,679,762	25.0	50,133,301	24.4
Water	21,507,235	11.5	18,189,526	8.8
Unspecified	5,401,898	2.9	8,448,138	4.1
Total	186,844,448	100.0	205,553,878	100.0

Table 3—Consumption of Sand and Gravel in 1955

Type of Consumer	1954 Short Tons	1954 Percent of Total	1955 Short Tons	1955 Percent of Total
Construction (buildings, highways, streets, etc.)	75,997,106	40.7	86,389,305	42.0
Ready mixed concrete	59,068,534	31.6	65,085,531	31.7
Concrete products	6,759,664	3.6	9,212,874	4.5
Railroad ballast	4,258,021	2.3	4,736,513	2.3
Sold through dealers	25,053,145	13.4	27,266,516	13.3
Other	6,453,847	3.5	5,069,954	2.5
Unspecified	9,254,131	4.9	7,793,185	3.7
Total	186,844,448	100.0	205,553,878	100.0

Table 4 is an analysis of the distribution of sand and gravel production in 1955 by size of company, based on returns from our 565 reporters, plus the 41 member companies whose statistics were otherwise available, for a total of 606. The largest number of companies are in two brackets: 50,000-100,000 tons, in which there are 107 companies, representing 3.7 percent of the total production; 100,000-200,000 tons, in which there are 143 companies, representing 9.1 percent of the total production.

Ten companies reported individual production of more than 3,000,000 tons of sand and gravel last year, accounting for 24.3 percent of the total production. It is interesting to note that the 75 percent of companies representing the smaller three-fourths produced less than 25 percent of the total tonnage.

Other tables (not reproduced here) present the production, value, transportation, and consumption data on a state basis. This is the first time such tables have been prepared in our report. In states and territories having fewer than three companies reporting, the data are not separately presented. This procedure is necessary in order to carry out our pledge to reporting companies that no use will be made of the data which might make possible the disclosure of individual company figures.

N.C.L.I. Summer Meeting

(*From page* 192)

Hills Quarry, E. Petersburg, Pa.), committee chairman, noted that there are no new legislative developments, and that litigation on which decisions are still pending deal largely with the end-use controversy under the statute and regulations for the years 1951-3. Robert Koch, N.C.L.I. executive vice-president, informed the board that there is considerable evidence of the fact that many producers are still unaware of the statutory tax relief available to them for the last five years in the matter of percentage depletion.

In his scheduled report to the board, Mr. Koch noted that the N.C.L.I. is making good progress and compares very favorably with the earlier growth of the N.A.L.A. and N.A.L.I. He pointed out that there had been a great deal of legislative activity in Washington during recent months on matters affecting this association, such as the highway program.

While stating that he had checked with a number of congressional leaders in getting their ideas and reactions, Mr. Koch indicated that putting the story across to members of the legislative branch is a big job and a critical one, particularly in view of the fact that some members of Congress have frequently entertained misconceptions of the features of proposed bills. Had they not been advised, these legislators could well have defeated bills in which this industry has a vital interest.

In commenting on the highway program, Mr. Koch suggested that the primary and secondary road system is as deserving of the industry's attention as the 40,000-mile main highway network, and that producers would derive comparable benefits from it. He stated further that while the average person thinks the highway program is established and ready to roll, there are actually innumerable details to be worked out with and among the officials of several government agencies. Mr. Koch added that when these details no longer require the urgent attention of the association staff, the latter will spend increasing time on the membership program.

It was suggested that activity of the association at the national level with respect to the highway program be developed by a committee that would establish contact with the Bureau of Public Roads. The purpose of such a committee would be to develop consistency in specifications and other practices among the states.

Table 4—Distribution of 1955 Sand and Gravel—Production by Size of Company

Size Group (tons)	No. of Companies	No. of Plants	Production (tons)	Percent of Reported Production	Percent of Participating Companies	Percent of Participating Plants	Accumulated Percents of Totals Total Production	Total Companies	Total Plants
0- 25,000	57	59	734,542	0.0	9.4	6.2	0.3	9.4	6.2
25,000- 50,000	72	77	2,611,170	1.2	11.9	8.1	1.5	21.3	14.3
50,000- 100,000	107	115	8,028,198	3.7	17.7	12.1	5.2	39.0	26.4
100,000- 200,000	143	193	19,714,574	9.1	23.5	20.3	14.3	62.5	46.7
200,000- 300,000	72	93	17,601,786	8.2	11.9	9.8	22.5	74.4	56.5
300,000- 400,000	28	39	9,308,162	4.3	4.6	4.1	26.8	79.0	60.6
400,000- 500,000	26	44	11,503,637	5.3	4.3	4.6	32.1	83.3	65.2
500,000- 600,000	17	34	9,139,985	4.2	2.8	3.6	36.3	86.1	68.8
600,000- 700,000	13	33	8,368,313	3.9	2.1	3.5	40.2	88.2	72.3
700,000- 800,000	12	22	9,054,776	4.2	2.0	2.3	44.4	90.2	74.6
800,000- 900,000	8	26	6,820,715	3.2	1.3	2.8	47.6	91.5	77.4
900,000-1,000,000	9	24	8,446,425	3.9	1.5	2.5	51.5	93.0	79.9
1,000,000-2,000,000	23	81	31,620,980	14.6	3.8	8.5	66.1	96.8	88.4
2,000,000-3,000,000	9	41	20,755,153	9.6	1.5	4.3	75.7	98.3	92.7
3,000,000-5,000,000	7	37	25,762,086	11.9	1.2	3.9	87.6	99.5	96.6
Over 5,000,000	3	32	26,809,692	12.4	0.5	3.4	100.0	100.0	100.0
Totals	606	950	216,280,194	100.0	100.0	100.0			

This table does include the 41 member companies which did not return our questionnaire, but whose total production of 10,726,316 tons of sand and gravel was otherwise available.

Dust Control 99% Effective At Bryan Rock and Sand Company

Only Routine Maintenance Required in Four Years

AN UNUSUAL record of effective and low-cost dust control has been established by the Neverson plant of the Bryan Rock and Sand Company, Bailey, N. C., high-volume producer of sand and rock for construction. Neverson, considered the largest rock quarry in North Carolina, has enjoyed the multiple benefits of a dust control system which has been in continuous operation for four years with relatively little maintenance and not a single breakdown.

In suppressing dust whenever it occurs, the company has created more healthful working conditions for employees, has improved employee morale and efficiency, eliminated complaints from both its own employees and citizens in the neighboring community, and gained longer life from equipment.

Before the installation of its present system, engineered and laid out by The Johnson-March Corporation, Neverson had a serious employee relations problem. Dust raised at one of the crushers was so annoying that two workers quit their jobs. At several other points dust was so thick that workers could barely see what they were doing.

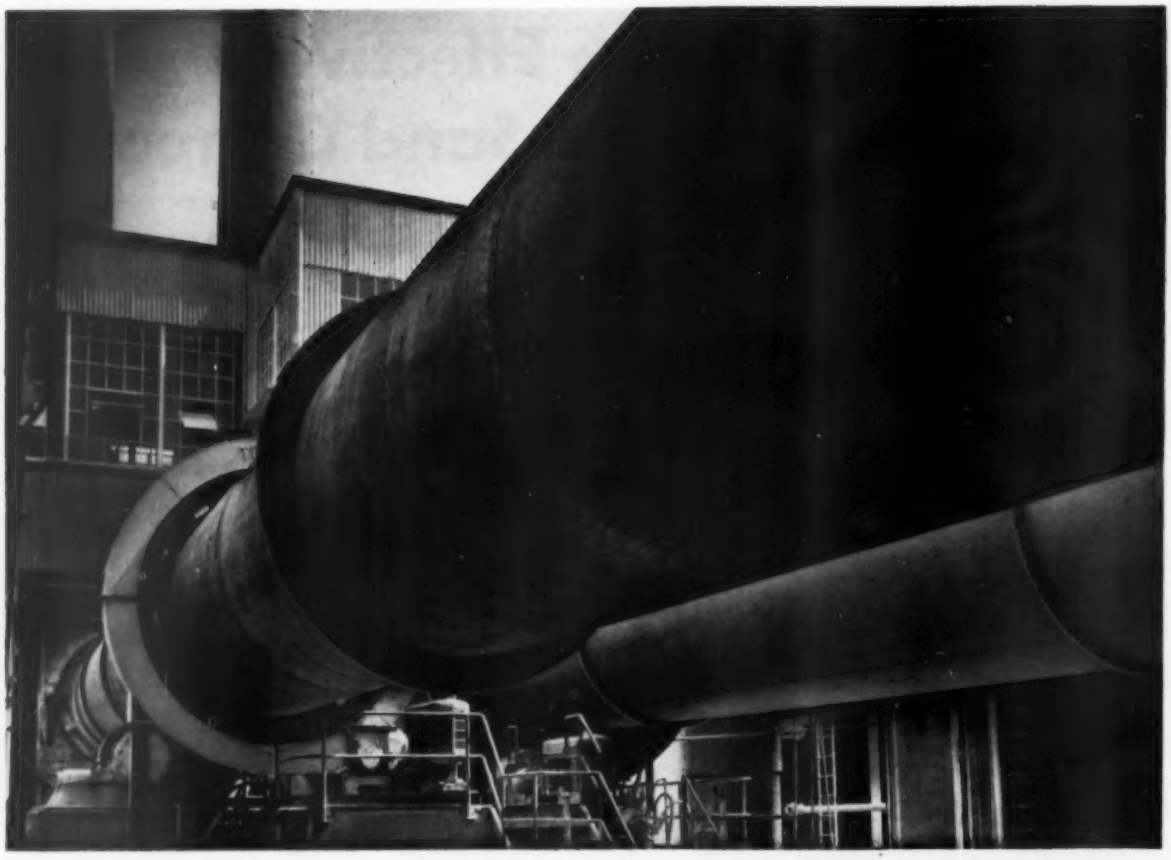
The company had tried formerly to smother the dust with water. This attempt proved completely ineffective because water alone could not "wet" the aggregate and contain the dust. It merely ran off the particles of rock.

In contrast, the Johnson-March system, which uses a liquid diffusion agent called Compound MR, does the required job of wetting and functions at almost perfect efficiency. The equipment employed in the system is uncomplicated, yet sound in every engineering respect. No special changes or modifications in the plant were required to install it. Other than routine maintenance, no special attention or adjustments are required to keep the system in good working order. It is simply turned on at the control hut at the start of the day's operation, and turned off at night.

The system now in use holds down dust by wetting the rock at all those points in the handling operation where dust is troublesome. It is in this wetting process that the company uses the specially formulated

A truck stands by to dump a load into the mouth of the primary crusher at the Neverson plant of the Bryan Rock and Sand Company near Bailey, N. C. The crusher is located beneath the steel girder framework (left). The conveyor moves rock from underground crushers beneath the building (left).

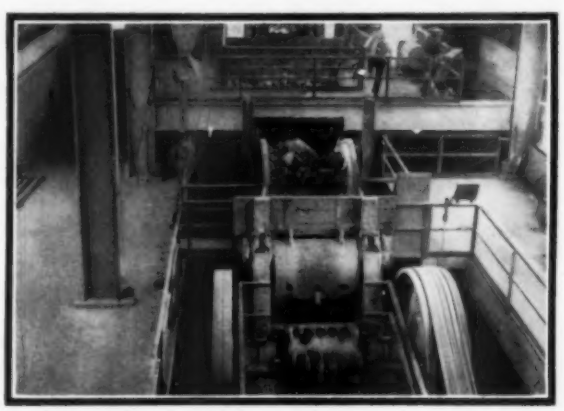
Below: This view of the sorter and two screening towers at the quarry is evidence of the virtually dust-free operations made possible by the plant's dust control system.



TRAYLOR ROTARY KILNS, long the standard of quality in the cement industry, feature the superior strength of all-welded steel shells plus the convenience of readily adjustable supports. These Traylor features assure perfect alignment to cut maintenance costs and reduce power requirements. Kilns are "Traylor-made" for each individual installation. Sizes have been built to 12′ in diameter and to 450′ long.

TRAYLOR JAW CRUSHERS are "Traylor-made" to provide the massive construction needed for 'round-the-clock heavy-duty primary breaking. Five types and 33 sizes are available with feed openings from 8″ x 12″ to 60″ x 84″, featuring Traylor's original curved jaw plates which deliver greater hourly production of finer product on lower maintenance cost and reduced power requirements.

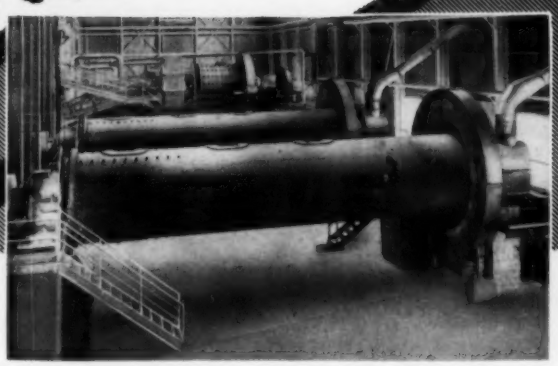
CEMENT is in short supply. You can sell all you can produce. Production shortages represent a very real profit loss to you. That is why it will pay you to cure any such shortage *before* it becomes a reality in your new or remodeled plant. Traylor Cement Machinery has a world-wide reputation for delivering a bonus of extra production over other equipment of comparable capacity. This is the result of Traylor's specialized interest in developing the best possible equipment for the Cement industry. Naturally this specialization has resulted in many design features that have proved to be the cure for many cement production shortages. Let a Traylor engineer go over your Cement Plant plans with you with an eye to curing production problems early. There's no obligation . . . just drop us a line today.



TRAYLOR ENGINEERING & MFG. CO.
852 MILL ST., ALLENTOWN, PA.
SALES OFFICES: New York • Chicago • San Francisco
CANADIAN MFR: Canadian Vickers, Ltd., Montreal, P. Q.

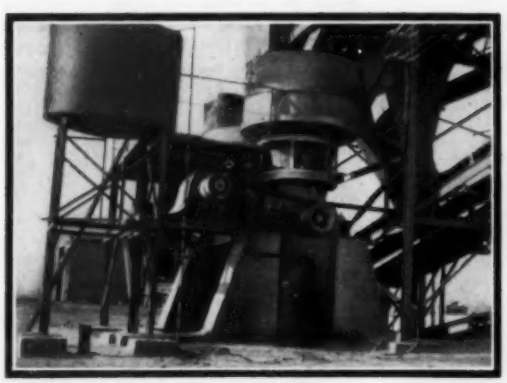
Traylor MACHINERY FOR

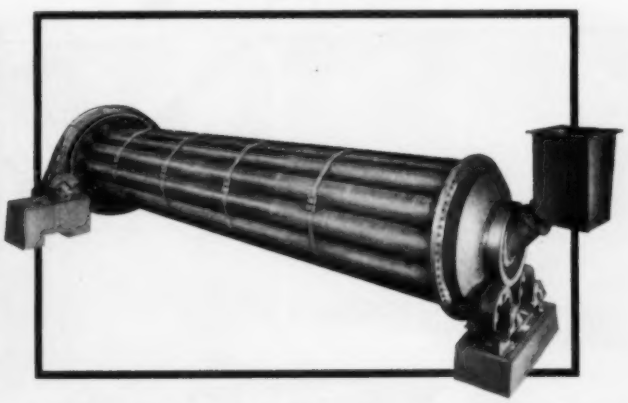
HERE'S THE RIGHT CURE FOR CEMENT PRODUCTION SHORTAGES



TRAYLOR REDUCTION CRUSHERS are outstanding examples of simple, compact design that combine maximum strength with peak operating efficiency. Spring suspension affords protection against tramp iron, bronze bushed eccentric assures long trouble-free service. Traylor's famous self-tightening Bell Head and Curved Concaves produce consistently uniform products with fewer waste fines. Six sizes with feed openings from 1½"to 22".

TRAYLOR GRINDING MILLS include Rod, Compartment, Ball and Tube Mills. Sizes to meet practically every requirement. Special mills are also available.





TRAYLOR MULTIPLE TUBE COOLERS for special applications are available as water cooled, air cooled or a combination of air and water cooled. Built to individual specifications, Traylor Multiple Tube Coolers provide the same construction features and operating economies as Traylor Kilns.

Descriptive literature outlining all the design and operating features of Traylor machinery is available on request. Write, stating your specific interest, and a copy of the appropriate booklet will be sent you.

"A Traylor leads to greater profits"

CEMENT PRODUCTION

Compound MR wetting agent. This is a highly concentrated chemical solution which is added in small amounts and instantly dissolved in ordinary water. It is non-toxic, non-corrosive, odorless, and harmless to the skin and clothing.

Action of the wetting agent on the rock dust is quick and effective. Unlike ordinary water, which tends to form globules and roll off a dry surface, water treated with Compound MR loses its surface tension. This lets the water spread further, penetrate deeper, and diffuse more widely than it would ordinarily.

A proportioning unit measures the amount of compound metered into the piping network of the system. The resulting solution is applied by spraying through strategically located nozzles. This spray pattern, at the right locations, stops the dust at its source.

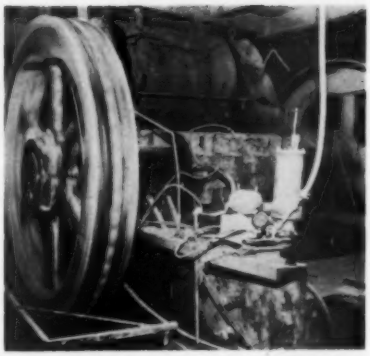
Neverson operates on a nine-hour day, six days a week, producing up to 4,000 tons of rock and 350 tons of sand daily. It works out of a quarry that is 100 ft. deep and more than a mile in circumference. Three power shovels dig the granite and load it into a fleet of dump trucks which haul it to the primary crusher.

Here the Johnson-March dust control system goes into action. This, in fact, is the first of four points in the rock-crushing operation where dust is controlled. (The other three locations are at the belt relay point along the edge of the quarry, the secondary crusher, and the final crusher.) The wetting agent is sprayed directly in the jaws of the primary crusher to minimize dust caused by the crushing operation. Without this means of dust control, maintenance men descending into the underground chamber would find conditions very unpleasant unless the entire crushing operation were completely stopped. Application of the Compound MR solution, however, quickly clears the atmosphere, making it a safe and healthy place to work.

The rock reduced in the primary crusher is carried on a conveyor belt up a steep grade to a belt relay point at the edge of the quarry. The upper end of this belt is carried to the top of a superstructure, and at this point the rock is dumped into a vibrating screen which then discharges the rock over a short tunnel.

In the tunnel, where the vibrator feeds an even flow of rock onto the second conveyor belt, there is another Johnson-March spray installation. One employee works in the tunnel keeping the belt free, and he reports that the dust is negligible with the spray in operation.

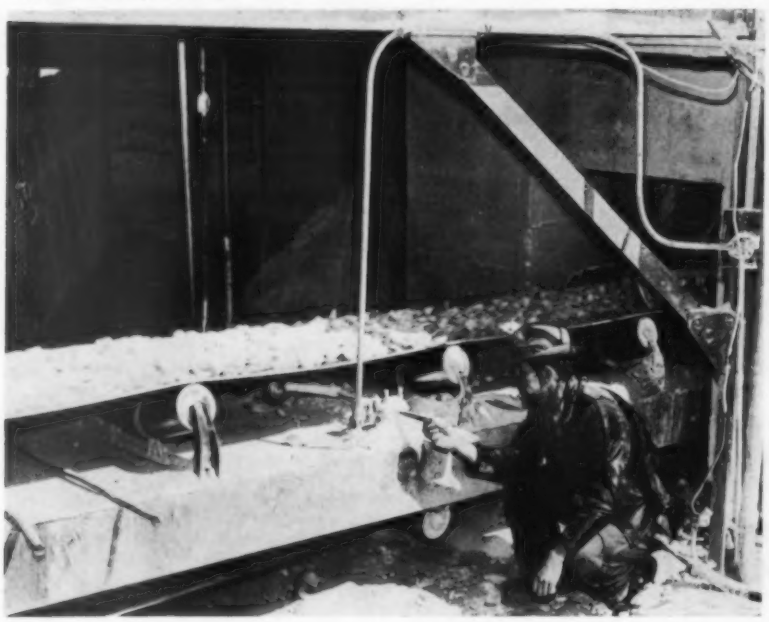
This second conveyor belt, starting underground in the tunnel, takes the rock to a large tower several hundred feet from the edge of the quarry. The belt discharges the rock from the top of this tower into the crusher. Again, a system of sprays wets the rock as it tumbles off the belt. Practically no dust is visible at this point when the dust control equipment is in operation. Another spray system wets the rock in the crusher as it proceeds to reduce the aggregate to 3-in. size or smaller.



The equipment which regulates the spray into the primary crusher.

From the secondary crusher another belt conveys the rock to the third and final crushing operation in a still higher tower nearby. This is the largest and most troublesome operation from the standpoint of dust. Two crushers break down the rock to its final product size of ¾ in. or smaller. Sand is also produced at this point, where much of the granite is completely pulverized. Again the dust-smothering wetting agent is sprayed on the rocks, at the top at the end of the conveyor belt and in the crushers.

The plant foreman checks the automatic controls at the base of the final crushing tower. The weight of the rock on the belt activates the sprays. After the rock has passed, the sprays are automatically shut off.



James Raybon, plant superintendent, inspects the metering unit in the control shed. All of the basic equipment used with the system fits into this compact space.

Considerable dust would ordinarilyl be created at this crushing point from the conveyor belt, from the sizing screens, and from the crushers. But almost no dust can be seen unless the dust control equipment is turned off.

The spray installation at the top of the crusher is turned off and on manually. Equipment used to spray inside the crusher is operated automatically, by means of a Johnson-March automatic nozzle control unit. When rock is on the conveyor belt, the belt sags, making contact with a wheel on the end of the control shaft which includes a micro-switch assembly. The deflection activates the micro-switch, which in turn opens a normally-closed solenoid valve, and thus activates the sprayer system, stopping the dust at just the right time and place. When the rock has passed and the belt load has been reduced, contact between the belt and automatic control is broken. The spray then shuts off until the next load comes along.

From this final crusher, the rock is carried to a larger tower nearby, where it is sorted into four sizes. It passes through the screens and falls in four piles at the four sides of the tower. At this point, the rock is still covered with the wetting agent. Since it is not broken again, no further dust control measures are needed.

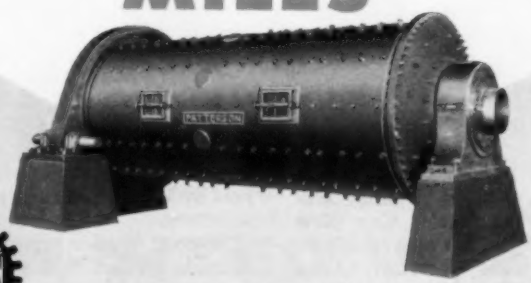
Trucks load the final products from the piles at the base of the tower. There are also other big storage piles of rock and sand nearby. This material can be loaded into trucks or railroad cars. Dust is so negligible in this loading area that, again, there is no need for any special control.

National Safety Council Publishes New Manual

A new foreman's training aid, entitled *Supervisors Safety Manual*, has been published by the National Safety Council. Written by staff engineers of the council's industrial department, the manual includes material on the human side of safety, maintaining interest in accident prevention, first aid, protective equipment, housekeeping, materials handling, machine guarding, portable power tools, and fire prevention.

This safety aid is illustrated with numerous photographs and drawings. It is available to council members for $3.25 (non-member prices are double) from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

LOW COST
CONTINUOUS GRINDING
WITH
Patterson
MILLS

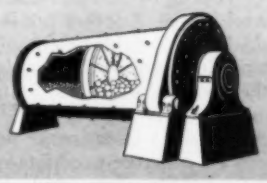


SATISFACTION PATTERSON MACHINERY

These smoothly performing Continuous Mills are most economical and efficient grinders. They are adaptable to fine or coarse grinding . . . wet or dry grinding . . . open or closed circuit grinding. Send for Patterson Catalog No. 534.

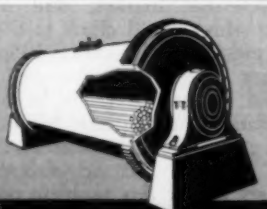
BALL AND TUBE MILLS

Standard Heavy Duty Ball or Tube Mill has replaceable cast alloy iron or steel lining . . . or may be lined with POROX (porcelain) for light duty applications.



COMPARTMENT TUBE MILLS

Separate compartments are charged with different size grinding balls. Compartments operate as several mills in series.



HEAVY DUTY CONTINUOUS ROD MILLS

Particularly desirable when a relatively coarse product with a minimum amount of fines is desired.

Ask for recommendation on the proper mill for your specific need.

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East Liverpool, Ohio, U. S. A.
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The Patterson Foundry and Machine Company, (Canada) Limited
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MONTREAL

N.I.S.A. Plans for Progress At Its Annual Meeting

AT THE recent annual meeting of the National Industrial Sand Association several outstanding papers were presented and important association business was transacted. New officers elected are: Emery M. Durstine (Keener Sand & Clay Co., Columbus, Ohio), president; William J. Cannon (Nugent Sand Co., Muskegon, Mich.), vice-president; and Arthur B. Schlesinger (New Jersey Pulverizing Co., New York, N. Y.), treasurer. Changes made in the board of directors at the previous meeting also became effective at this meeting.

Directors elected for three years are: P. Grant Forman (Industrial Silica Corp., Youngstown, Ohio); James C. Lockwood (Ottawa Silica Co., Ottawa, Ill.); C. Charles McKay (Whitehead Bros. Co., New New York, N. Y.). Two-year directors are: Charles A. Gorsuch (Ayers Mineral Co., Zanesville, O.); Gene M. Mason (Clayton Silica Co., Waterloo, Iowa); and George F. Pettinos Jr. (George F. Pettinos, Inc., Philadelphia, Pa.). Directors for one year are: Earle T. Andrews (Pennsylvania Glass Sand Corp., Hancock, W. Va.); Russell J. Cronenweth (Great Lakes Foundry Sand Co., Detroit, Mich.); and Alfred Gawthrop (Wedron Silica Co., Chicago, Ill.) Ex officio members of the board are: George A. Thornton (Ottawa Silica Co., Ottawa, Ill.); Sterling N. Farmer (Sand Products Corp., Cleveland, Ohio); and Clarence R. Wolf (New Jersey Silica Sand Co., Millville, N. J.). Hereafter at each annual meeting three new members of the board will be elected to serve three years each.

The new president, Emery M. Durstine, reorganized all association committees and appointed the following chairmen: Committee on Taxation, Arthur F. Harrison (Central Silica Co., Zanesville, Ohio); Committee on Fineness and Grading of Foundry Sands, W. D. Chadwick (Manley Sand Co., Rockton, Ill.); Traffic Committee, William J. Woods Jr. (Pennsylvania Glass Sand Corp., Lewistown, Pa.); Advisory Committee on Labor, Ralph S. Lebold (Michigan Silica Co., Rockwood, Mich.); Advisory Committee on Health, Earle T. Andrews. These committees will meet on the first day of the semi-annual meeting which will be held at The Greenbrier, White Sulphur Springs, W. Va., October 16-19, 1956.

The program included a review by John T. Sapienza, association tax counsel, of current legislative and administrative tax developments which are of interest to the industry. William D. Chadwick reported on the excellent progress being made by his Committee on Fineness and Grading of Foundry Sands. William J. Cannon reported on sand reclamation practices, and Emery M. Durstine gave his report as chairman of the Traffic Committee. Ralph S. Lebold reported for his Advisory Committee on Labor, and Earle T. Andrews for his Advisory Committee on Health. The meeting was closed with an informative Washington Report by Vincent P. Ahearn, executive secretary.

Stanton Walker, consulting engineer for N. I. S. A., spoke on *Some External Problems of the Industrial Sand Industry*. For the first time, he said, the foundry industry is being informed on the thinking of the industrial sand industry in a direct way; this fact should be of benefit to both segments. He suggested that further studies should be made on the reproducibility of tests of foundry sands as there is still much uncertainty as to the significance of many tests long standardized and widely accepted. According to Mr. Walker, it might be possible to establish a fellowship at a qualified university or college or to enter into a contract with one. Another possibility would be the establishment of a fellowship with some such organization as the National Bureau of Standards.

The use of silica flour in the field of autoclaved concrete products is a large potential market, said Mr. Walker, which could climb to 600,000 or more tons annually within a few years. Research on this product is needed; but unfortunately, he said, the variables entering into the problem do not make it suitable for industry research. He advised that producers attack this problem on a company basis in co-operation with customers.

In his report Theodore C. Waters, association counsel, reported on insurance programs for the protection of employers and property owners. He advised producers to study carefully their workmen's compensation insurance and the employer's liability. Public liability insurance has also assumed greater importance because of the rising amounts of judgments. Mr. Waters stated that he prefers the comprehensive general liability policy. He pointed out that verdicts against carriers under the Federal Employers' Liability Act have been running into large figures and urged that producers study this matter carefully. Mr. Waters then discussed the model workmen's compensation law prepared by the U. S. Department of Labor, a development which must be viewed with concern as it can create a real threat to industry.

George C. Wilsnack Honored By University of Denver

Lauded as a "searching scholar, skilled scientist, and eminent researcher," George C. Wilsnack, director of research for Ideal Cement Company, received an honorary Doctor of Science degree on June 8 from the University of Denver. Further commendation at the ceremony

G. C. Wilsnack

cited Dr. Wilsnack for "conceiving and bringing into practical application theories of the highest importance to the industrial development of the nation."

During his career in the cement industry, Dr. Wilsnack has prepared and presented many papers. Among these were a study on clinker rings, a graph method for designing four component portland cement raw mixes, and the causes and correction of false set in portland cements.

HERE'S A MAN-SIZED JOB

This is one of six CAT* DW21s with No. 21 Scrapers which handled *one million tons of clay and rock* during a Nevada winter. Working 20 hours a day, six days a week, these machines stripped overburden at a copper pit near Kimberly. Each unit loaded 15 bank yards in one minute (push-loaded by a Caterpillar D8 Tractor), made the half-mile round-trip haul, and then dumped in 25 seconds. These fast-working yellow rigs are owned by Young & Smith Construction Co. of Salt Lake City, Utah.

Outstanding though this production record is, there is now a *new* Caterpillar DW21 (Series C) and No. 470 Scraper with LOWBOWL design which will move even *more* material in *shorter* time at *less* cost per yard. Its new four-cycle diesel engine develops 300 HP (maximum output) and has a Turbocharger which packs in air according to load, not speed, for more working horsepower and greater performance.

With LOWBOWL design, the 25-yard (heaped capacity) No. 470 Scraper can handle bigger payloads faster than ever before. The bowl is shallower, wider and longer than old-fashioned scrapers for less resistance throughout the loading cycle. In on-the-job tests, the Cat DW21 and No. 470 Scraper handled at least 20% more material than any other unit in its class.

Whether for coal or metal mining, the application of the Caterpillar DW21 and No. 470 Scraper is the same. With ample power, large capacity, and wide-footprint tubeless tires for good flotation, this big yellow team can speed production and cut costs on *your* operation. Your Caterpillar Dealer—who provides skilled service and parts you can trust—will gladly give you full details. Call him soon.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Lined . . . and relined with Lorain . . .

Primary clinker mill grinds 37,873,000 bbls. of feed efficiently and economically

At Hudson, New York, the Universal Atlas Cement Company has been using USS Lorain Rolled Steel Plate Linings in its grinding mills since 1938. One 10′ - 6″ x 12′ Preliminator alone has ground 37,873,000 barrels of clinker up to February 13, 1956, consuming only two sets of linings and lift bars.

The first lining in this mill was made of 2″ liner plates and lift bars, Section M-3714, designed to permit replacement of bars during life of the lining. In grinding the 38 million barrels of clinker, one lining and one set of renewal bars were completely worn out. But despite the tremendous tonnage processed, the second lining installed was still in serviceable condition when the mill went down for general repairs in February.

HEAVIER-DUTY LINING—The performance of the original Lorain linings was so impressive that management at Universal Atlas decided to install the latest type Lorain lining with deep recessed liner plates and extra-heavy lift bars, Section M-4497, to further increase the mill's grinding efficiency and to eliminate the need for replacing lift bars. The new type lining was installed during the repair period in February so production would not be interrupted during the peak season this summer. Frankly, no shutdown due to lining problems is expected for the next several years.

LONGER LIFE . . . CONSTANT LIFT—USS Lorain Rolled Plate Linings are made of tough, rolled steel that means longer grinding life. Lift bars are rolled alloy steel, heat treated to obtain a hardness differential that will maintain lift height throughout life of the lining, thus providing maximum grinding efficiency. Each Lorain Lining is tailor-made to fit a particular mill. The linings fit snugly—shell wash is eliminated. Mr. A. E. Glasspool, Maintenance Supervisor at Hudson, said "Lorain Linings are designed right and they fit tight. Each piece was properly marked, so we had no trouble with installation."

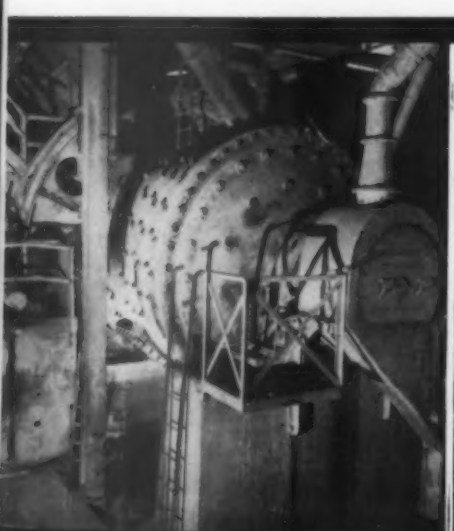
These heavy-duty linings installed by Universal Atlas will provide effective grinding action without fear of broken bolts, cracked plates or bars, and will continue to perform efficiently until the plates wear paper-thin.

WE'RE GLAD TO HELP—If you are not aware of the merits of USS Lorain Rolled Plate Linings and are not using them—if you are experiencing lining difficulties of any nature, we will be glad to have a sales representative call on you. Just write to: United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

This 10′-6″ x 12′ Preliminator mill in Universal Atlas Cement's Hudson, New York, plant has ground 37,873,000 bbls. of clinker at a rate of 360 bbls. per hour.

The specially designed bolts will hold the Lorain Lining snug and tight for the life of the lining without fear of breaking. Lorain Linings are made of tough, rolled steel that is tailor-made to accurate shapes.

Although there was still some life left in the old lining, management decided to install the heaviest-duty Lorain Rolled Plate Lining for even greater grinding efficiency, and to assure continuous operation for several years to come.



These new, heavy-duty lift bars, Section M-4497, and 2-inch-thick liner plates are expected to increase mill efficiency. This lining will retain lift for millions of tons. USS Lorain Rolled Plate Lining successfully grinds until plates are worn paper-thin. USS Lorain-designed special manholes and covers were also an unusual feature of this installation.

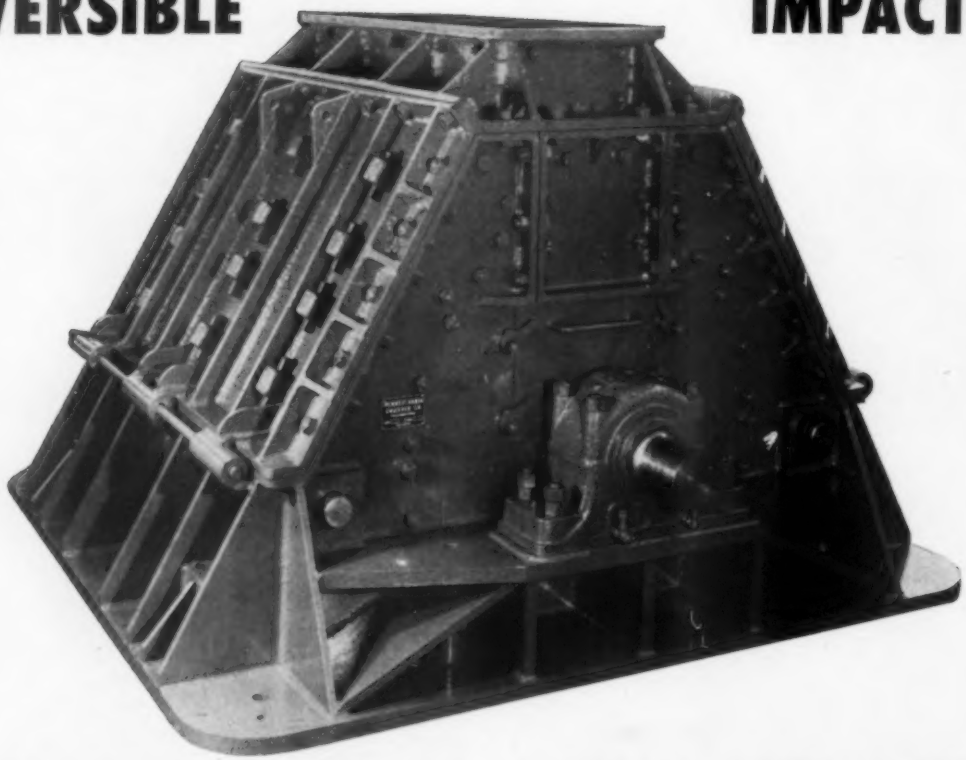
UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS LORAIN ROLLED PLATE LININGS *and* USS GRINDING BALLS

UNITED STATES STEEL USS

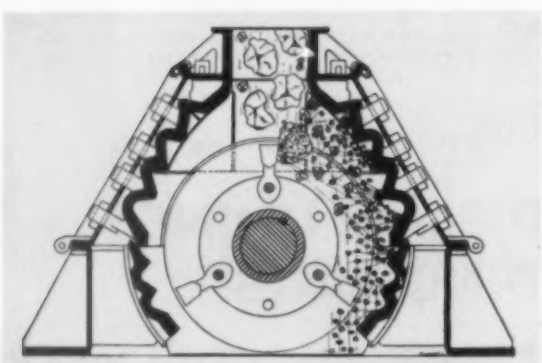
PENNSYLVANIA

REVERSIBLE IMPACTOR



THIS CRUSHER HAS MADE, AND IS MAKING, CEMENT HISTORY

In 1937 Pennsylvania designed, built and installed the first Impactor in a cement plant. From the start of operation it was apparent that this machine would have a definite place in the cement and crushed stone industries, but no one could predict its rapid and universal acceptance. Today one or more Pennsylvania Reversible Impactors are installed in 55 plants of 43 cement companies. As is to be expected, the design is imitated but 24 out of 25 Impactors sold to cement plants are Pennsylvania Impactors. Play it safe, buy a Pennsylvania and be sure of low maintenance costs and a uniform product year after year. Whenever you need help on your crushing problems write Pennsylvania Crusher Division of the Bath Iron Works Corporation, West Chester, Pennsylvania.



PENNSYLVANIA

IMPACTORS
HAMMERMILLS
JAWS • GYRATORIES
SINGLE ROLLS

PE-195

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

WIRE ROPE FITTINGS AND ACCESSORIES, including sockets, hooks, sheaves, thimbles, and clips, are presented in Catalog 22, recently released by the *Farrell-Cheek Steel Company.* Diagrams and tables supplement the descriptive information on each type of wire rope product. **(1)**

EUCLID DIVISION of *General Motors Corporation* has just published three catalogs describing the overhung engine line of "Euc" scrapers, Models S-7, S-12, and S-18. Each catalog contains cut-away views of major components and photographs that help to explain the accessibility and operating features. Specifications, performance tables, and illustrations are included. **(2)**

"CAT ELECTRIC SETS FOR POWER AND PROTECTION" is the title of a new 16-page booklet published by the *Caterpillar Tractor Company.* The booklet lists many of the different uses to which these versatile power plants can be put, and some of the reasons for their suitability to these applications. **(3)**

TISCO "TIMANG" MANGANESE-NICKEL-STEEL WELDING PRODUCTS, including rods, hot-rolled plates, special shapes, wedge bars, tooth repointers, and applicator bars, are listed in a catalog released by the *Taylor-Wharton Division, Harsco Corporation.* Prices, stock sizes, and application information are presented in the illustrated catalog. **(4)**

THE 1956 LINE OF JEEP four-cylinder industrial engines and power units is described fully in a new brochure issued by *Willys Motors, Inc.* Suggested applications for engines and units are included, along with descriptions of the special features incorporated in Jeep industrial engines. **(5)**

BULLETIN 50, offered by the *Acker Drill Company, Inc.,* features a complete line of soil sampling tools, rotary earth augers, diamond and shot core drills, earth boring equipment, and drilling accessories and supplies. The 39-page catalog is well-illustrated with photos, diagrams, and tables. **(6)**

THE 1956 ONAN ELECTRIC PLANT CATALOG is now available from *D. W. Onan & Sons Inc.* The illustrated catalog has been designed to facilitate the selection of the proper type of generating plant and necessary accessories for the particular needs of the reader. Set up in simple two-page spreads, each separate series of Onan electric plants is listed in complete detail. **(7)**

KREBS HEAVY DUTY VALVES are presented in Bulletin No. 65, available from *Equipment Engineers Inc.* The bulletin features performance curves illustrating how round hole closing makes a difference compared with conventional pinch valves. **(8)**

ULTRALITE, a lightweight glass fiber insulation manufactured by the *Gustin-Bacon Manufacturing Company,* is described in an illustrated booklet depicting the several types of Ultralite and its many applications. **(9)**

REPLACEMENT CLOTH FILTER BAGS fabricated from cotton, orlon, nylon, asbestos, dynel, wool, and glass by *Industrial Filter Products, Inc.,* are designed for use in dust collecting, fume control systems, and pressure filtration. **(10)**

HEAT-RESISTANT AND WEAR-RESISTANT CASTINGS are described in Bulletin S-17, a 36-page publication of *The Babcock & Wilcox Company.* Physical and mechanical properties of materials at elevated temperatures are included to aid the engineer in the proper selection of materials and design stresses for a given application. **(11)**

THE P&H 1055E SHOVEL, manufactured by the *Harnischfeger Corporation,* is completely electric, driven by constant-speed a.c. motors throughout. The 1055E utilizes the Magnetorque principle for all shovel motions. Magnetorque eliminates d.c. reversing motors and their accompanying motor generator sets, and is said to result in as much as 20 percent increased production. **(12)**

KEYSTONE-FRANKS MODEL 50 ROTARY DRILLING RIG, a product of the *Stardrill-Keystone Company,* is especially suited for air drilling. The drill may be equipped with both a mud pump and an air compressor as a combination machine, or it may be equipped with an air compressor where it is to be used for blast hole drilling. **(13)**

BULLETIN GEA-6341, offered by the *General Electric Company,* discusses the design features and maintenance of the

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61	62	63	64	65	66	67	68	69	70	71	72	73	74	75					

In addition I would like information on:

_____

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

new Tri-Clad "55" explosion-proof motors for use in hazardous locations. Safety features include a non-sparking fan, sealed lead entrance, dust-tight labyrinth seal, and shock resistant cast-iron end-shields. (14)

LIMBEROLLER BELT IDLER BOOKLET 2-68A, offered by *Joy Manufacturing Company,* contains design and application data for those who select, specify, purchase, and use belt conveyors to handle bulk materials. Included are descriptions, dimensional drawings, specification tables, and suggested applications for "Limberollers" idlers. (15)

A 44-PAGE BOOKLET featuring tables for quick and easy selection of variable speed "Texrope" drives has been released by the *Allis-Chalmers Manufacturing Company.* The booklet includes information on design features, drive principles, accessory equipment and horsepower rating tables for A, B, D, C, and E section belt. (16)

OPERATION AND DESIGN FEATURES of standard and short head type Symons Cone Crushers are described in detail in a 24-page, color bulletin recently published by the *Nordberg Manufacturing Company.* Dimensions, horsepower requirement, operating speed, and weight of each model are included. (17)

CATALOG 1551, "pH and Conductivity Recorders and Controllers", available from the *Minneapolis- Honeywell Regulator Company,* includes information about the latest equipment for measuring, indicating, recording, and controlling the electro-chemical variables: pH, Redox, and conductivity. The fundamentals of electro-chemical instrumentation are reviewed, and basic systems are described. (18)

MANGANESED-PHOSPHOLENE NO. 7 has been developed by *Western Reserve Laboratories* for the prevention and removal of rust. It combines chemically with iron, steel, or zinc to form a non-metallic moisture and water proof coating that becomes integral with metal. (19)

DOUBLE-SUCTION SINGLE-STAGE CENTRIFUGAL PUMPS are described and illustrated in a bulletin released by the *C. H. Wheeler Manufacturing Company.* Cross section drawings and construction details for standard sizes up to 10-in. discharge are included. (20)

AUTOMATIC SENSING DEVICES that can indicate a lack of material supply or flow in a handling operation are presented in a technical reference offered by the *Richardson Scale Company.* (21)

IMPROVE YOUR SAND AND GRAVEL SPECIFICATIONS at a low cost per ton. Of compact design, the Meckum sand and gravel jig separates low from high specific gravity materials with a positive water and mechanical action. Complete details can be obtained from *Meckum Engineering, Inc.* (22)

LE-HI AIR HOSE FITTINGS for mining, quarrying, construction, and industry wherever compressed air is utilized are illustrated in Bulletin No. 110 available from the *Le-Hi Division, Hose Accessories Company.* Complete information on sizes and part numbers is included. (23)

V-BELTS are the subject of a new bulletin recently issued by *Worthington Corporation.* The bulletin contains illustrations of the many Worthington-Goodyear types of V-Belts available for drives employed in heavy industrial applications and miscellaneous light machinery drives. The many V-Belt sizes available are also listed. (24)

THIS IS FARRELL-BIRMINGHAM, a new 44-page booklet available on request to *Farrell-Birmingham Company, Inc.,* gives a factual and pictorial view of the ability of the company's four plants to design and manufacture a wide variety of heavy machinery and machine tools. (25)

SIMPLIFIED WELDING PROCEDURES for every base metal are featured in a new 140-page Pocket Data Book now available from *Eutectic Welding Alloys Corporation.* The book, covering 120 welding rods, electrodes, and welding compounds, is a guide to improved torch and metallic arc welding, brazing, and soldering. (26)

STURTEVANT DRY PROCESSING EQUIPMENT—*the Open-Door to Lower Operating Costs over More Years* is the title of the latest booklet offered by *Sturtevant Mill Company.* The booklet contains photos and specifications of production and laboratory equipment, and discusses Sturtevant's "Cooperative Engineering Plan". (27)

July, 1956

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I'm using Primacord

"You understand . . . I don't *like* thunderstorms. No blaster does. But ever since that job in Kentucky when a direct hit failed to detonate Primacord, I make it a point to use this detonating fuse during the thunderstorm season."

Here's the reason. Primacord is an insensitive detonating fuse. It is not affected by stray electrical currents. It cannot be set off by friction, sparks or ordinary shock. It must be detonated with a blasting cap.

Primacord is used to detonate the entire load in each hole, and to connect all holes in planned sequence to produce *good digging.* A detonating cap is attached to the Primacord only after everything is ready . . . when men and machines are out of the danger zone.

Use Primacord wherever there is danger of stray electrical currents — and particularly during thunderstorm seasons.

For more information see your Explosives Supplier, or write to

THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut

Primacord — Quarrycord — Ignitacord® Safety Fuse — Blasting Accessories
Established 1836

To connect a Branch Line of Plastic Reinforced or Plastic Wire Countered Primacord with the Trunk Line

use this DOUBLE HITCH in the textile-covered Primacord Trunk Line. *Draw it up as tight as you can, and make sure that the Branch Line leads off at a RIGHT ANGLE to the Trunk Line.*

PRIMACORD®

DETONATING FUSE

PROVED AND APPROVED

P-21

Cut the Primacord off the Spool Immediately

Make this a safety *habit!* As soon as you have taken off the length of Primacord you need for a down-hole or for a trunkline, *cut it off the spool! Don't waste a second — do it now!*

To connect the Detonator with the Primacord Trunk Line

use FRICTION TAPE. You can detonate Primacord with fuse and cap or electric blasting cap. Lay the cap alongside of the Primacord with the business end of the cap pointing in the direction that the Primacord will detonate. Tape the two snugly together, so that you have a tight connection.

To connect a Branch Line with the Trunk Line

Use this HALF HITCH for Plain and Reinforced Primacord. *Draw it up as tight as you can, and be sure the Branch Line leads off at a RIGHT ANGLE to the Trunk Line.*

To lengthen a Trunk Line

of Plain or Reinforced Primacord, tie a SQUARE KNOT. *Draw it up as tight as you can* — it won't slip back. Caution: don't use any knot in a hole — it might break or hang up explosives when loading.

Fights Deposits!

Keep out power-robbing deposits in your heavy duty Diesels. Refill with Sinclair SUPER TENOL® for the tough jobs! It helps to eliminate deposits of carbon, varnish and sludge that impair engine efficiency. SUPER TENOL is specially engineered to fight the effects of high temperature, engine over-load and continuous stop-and-go operation. Your engines last longer!

Refill now with Sinclair SUPER TENOL. Contact your local Sinclair Representative or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

SINCLAIR

SUPER TENOL MOTOR OIL

Industry Personalities

JOHN H. JONES has been named operations manager of Penn-Dixie Cement Corporation, it was announced by B. W. Druckenmiller, president. Mr. Jones, who joined Penn-Dixie in 1948, was most recently superintendent and operating assistant at the company's Nazareth, Pa., plant. Prior to this he was engineer of the firm's plants at Clinchfield, Ga., and Bath, Pa.

RODNEY G. BUERGIN has been promoted to the position of director of technical service in the Research Division of the National Gypsum Company, Buffalo, N. Y.

Mr. Buergin joined National Gypsum in 1950 as a research engineer. Later he advanced to research supervisor and to research group leader. For the last two years he has been assistant director of development research.

Five promotions in rank were announced by Vincent H. Shea, president, Shea Chemical Corporation, Jefferson, Ind.

E. P. MADSEN was promoted to the post of senior vice-president. He had served as controller and vice-president since joining the firm in 1952.

JAMES D. HOGAN, formerly assistant to the president, was named vice-president.

J. B. SUTLIFFE, who has directed the firm's industrial sales program, will continue to do so under his new title of vice-president. In addition, Mr. Sutliffe will head the company's New York office.

G. C. TAYLOR has been appointed controller at the Jefferson plant, where he had been assistant controller since January of this year.

VINCENT H. SHEA JR. was appointed to the newly-created position of general purchasing officer. He was formerly sales co-ordinator and plant purchasing officer at the Columbia, Tenn., plant.

Cris Dobbins, president of Ideal Cement Company, Denver, Colo., has announced several recent appointments in the production department.

E. F. BOLLINGER was named Pacific regional production manager, succeeding A. G. LANG, who has been appointed consultant, engineering and construction, Pacific division.

A. W. HOOTON was promoted to the position of Rocky Mountain regional production manager.

J. C. ANDREWS has been named manager of the Boettcher, Colo., plant.

C. S. BURRISS was transferred from Ideal's Trident, Mont., plant to Devil's Slide, Utah, as plant manager. HAROLD LAMONT succeeds him as manager of the Trident plant.

W. S. FOGELBERG has been promoted to plant manager of the Baton Rouge, La., operation.

HORACE STRAIGHT was transferred from Devil's Slide, Utah, to Portland, Colo., where he now serves as plant manager.

J. L. BAXTER was transferred from the San Juan to the Redwood City, Calif., plant as assistant plant manager.

D. C. Honey

DAVID C. HONEY was recently elected assistant secretary of the Riverside Cement Company, Los Angeles, Calif. In addition to the new office, Mr. Honey is assistant to the vice-president and general manager of the company, in charge of the program of research in the field of industrial engineering and quality control.

Mr. Honey was graduated from Yale University and the Harvard Graduate School of Business.

Prior to his employment with the Riverside Cement Company in 1954, Mr. Honey was associated with McKinsey & Company, a national management consulting firm. He is a member of the American Institute of Industrial Engineers.

ARNOLD SOBEL has been elected a vice-president of Material Service Corporation, it was recently announced by Henry Crown, chairman of the board.

Mr. Sobel was manager of the marine department, and has been with Material Service Corporation for 18 years, having started in yard operations.

In this newly-created vice-presidency he will have responsibility for all building material distribution yards and the marine department, and will coordinate these activities with the operating plants, main office, and sales departments.

M. C. LaVail

MATT C. LAVAIL has been named district sales manager of the Featherlite Corporation, Dallas, Tex.

In his new post Mr. LaVail will specialize in sales of Featherlite expanded shale aggregate used in the manufacture of concrete and concrete products, as well as monolithic concrete for the construction industry.

Mr. LaVail has been associated with the building and construction industry for several years as a specialist in lightweight aggregates and concrete. He is a member of the American Concrete Institute, and formerly served on the College Training Committee of the Texas Concrete Masonry Association.

Colin L. Campbell, general sales manager of the Kaiser Gypsum Company, Inc., Oakland, Calif., recently announced the following appointments in the company's Western sales districts:

RAYMOND A. ETHELL has been appointed sales representative in the Yakima, Wash., area.

WILLIAM E. WIEDERHOLD JR. was named sales representative, operating out of Portland, Ore.

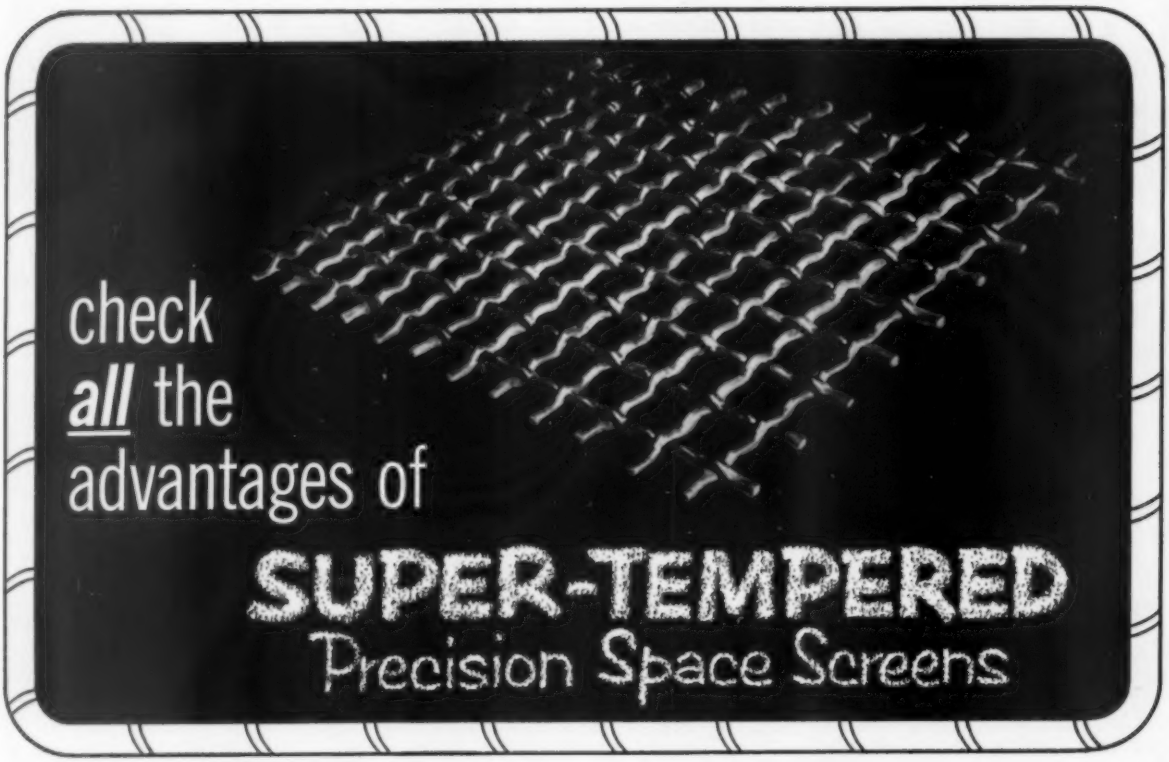
EDWARD A. MILLIS JR. was appointed sales representative in the Long Beach, Calif., area.

DR. GEORGE MCCOY has been named manager of the Research and Development Department of the Pennsylvania Salt Manufacturing Company, Philadelphia, Pa. Since joining Pennsalt in 1944, Dr. McCoy has served successively as senior research chemist, group leader, assistant director, and director of organic research.

W. C. O'Brien

WILLIAM C. O'BRIEN has been appointed New York district sales manager of The Ruberoid Company, New York, N. Y., replacing Ira Ruhl, who has retired.

Mr. O'Brien joined Ruberoid in 1941 as a sales representative in the Philadelphia area. His new headquarters are located in South Bound Brook, N. J.



✓ less downtime ✓ uninterrupted production

✓ accurate screening ✓ longer screen life

✓ maximum resistance to abrasion, vibration and fatigue

Here's why these screens assure maximum screen life and biggest savings for you:

They are made from special super-tempered wire heated red hot and quenched in oil to give extreme hardness. Then they're tempered in molten lead to obtain the toughest structure possible. Finally, the wire is crimped to precision standards and woven extra tightly on heavy-duty hydraulic looms to insure accurate, uniform spacing under the severest vibration.

This superior screen will give you peak performance on even your most demanding jobs. To order, write or phone your requirements to our nearest sales office.

CF&I SPACE SCREENS

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION: Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix Portland • Pueblo • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Wichita • WICKWIRE SPENCER STEEL DIVISION: Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CANADIAN OFFICES AT: Calgary • Edmonton • Vancouver • Winnipeg

3331

E. R. Hyde, L. E. Manning, C. R. Lorenz Jr., and B. E. Raymond were recently appointed to new posts in the Keystone Division of the Dravo Corporation, Pittsburgh, Pa. Mr. Hyde, formerly manager of the division's South Side plant (Pittsburgh), has been named operations manager. Mr. Manning, who joined the division in 1947, succeeds Mr. Hyde as plant manager.

Mr. Lorenz, who came to the division in 1951 and has been plant maintenance engineer since 1954, was named as the assistant to the operations manager. He was succeeded as plant maintenance engineer by Mr. Raymond, who has held the position of equipment engineer since 1953.

JAMES S. BIXBY has joined New York Trap Rock Corporation, New York, N. Y., on a consulting basis after his retirement from state service on May 1. He has been district engineer for the New York State Department of Public Works since 1924. Mr. Bixby will serve in an advisory capacity to assist with technical matters and activities in the field of community relations.

After receiving his bachelor of science degree in civil engineering in 1908, Mr. Bixby began his career with the State of New York as a surveyor's rodman. In 1910 he became a member of the three-man commission which was organized as the first State Highway Department. He is a past-president of the American Association of State Highway Officials.

ARTHUR H. O'CONNOR has been elected vice-president of the Material Service Corporation, Chicago. Mr. O'Connor started with Material Service Corp. 27 years ago as an office boy. He rose through the accounting, purchasing, and sales departments to become assistant sales manager in 1948.

ELMER A. PETERSON was recently promoted to the office of vice-president of Rocklite Products, Ventura, Calif. Mr. Peterson had served the firm as general manager of operations in southern California since the beginning of operations at Ventura and Los Angeles in February, 1947. The promotion was announced by E. F. Brovelli, president.

J. P. FEISER, vice-president of the Le Gore Lime Company, Le Gore, Md., died on April 22 after a protracted illness. Mr. Feiser was an active member of the National Lime Association for 40 years, and served for several years as a director.

Legal Decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

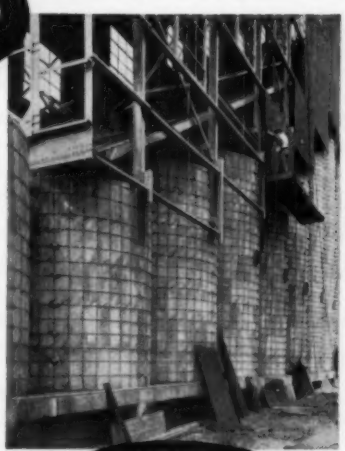
Overload Truck Causes Injury

Some time ago at a convention of quarry owners and operators it was suggested that I write up the law on damage liabilities of quarry owners who permit truck drivers to overload motor trucks, with resultant damage to the truck or injuries to employees. Recently, I located a higher court decision which clearly explains all phases of the law on this subject.

In *DeMichiel v. General Crushed Stone Company*, 218 Fed. (2d) 186, the testimony showed that a motor truck owner named Powell took a contract from a contractor to haul crushed rock to a road repair job being done by the contractor. The latter bought the rock from the General Crushed Stone Company, which operates a quarry. Powell was paid by the contractor on a payment per ton basis for hauling stone from the quarry to the road project.

One day Powell, driving his own truck, delivered a load of stone to the road job. DeMichiel was a labor foreman on the job at the point where the stone was delivered. The truck was greatly overloaded. The delivery slip which Powell handed DeMichiel on arrival revealed this fact. As the truck stood at the unloading point, Powell, seated in the cab, mechanically elevated the front end of the dump body as high as the hoisting mechanism would permit. Extending from this elevated front of the body was a lever which controlled the opening of the tail gate. Powell requested DeMichiel to pull this lever. In order to reach the lever DeMichiel mounted the running board of the truck. Holding the side of the cab with one hand he pulled the lever with the other and at about the same time Powell drove the truck forward 3 or 4 feet. These operations caused a rearward

16
NEFF & FRY BINS
IN THIS GROUP



These bins are used for handling silica sand. They range in size from 18′ dia. x 52½′ high to 12′ x 12½′. Machinery for screening and grading the sand is mounted directly on the bins without extra supports, proving the load-bearing strength of Neff & Fry construction.

Thousands of Neff & Fry Bins are being used for handling and storing nearly a hundred different kinds of bulk materials, including grain, coal, seeds, minerals, chemicals, clay, wood chips, etc.

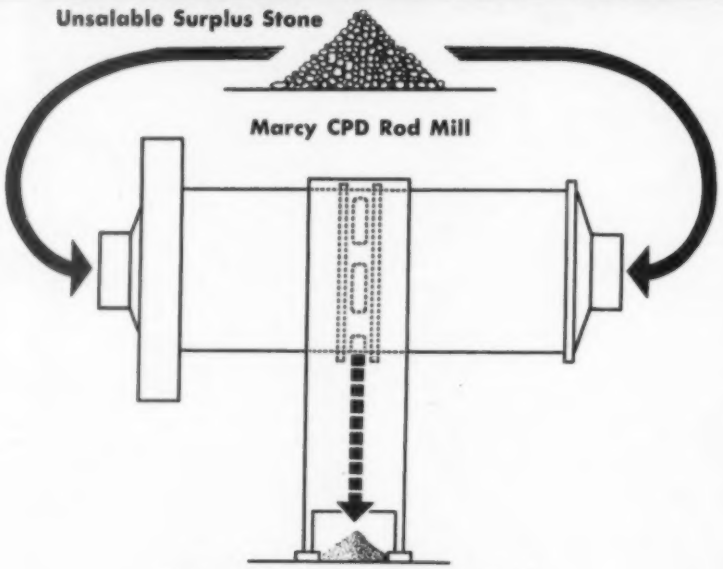
Before you decide on storage bins, ask us for complete information. Read our folder, "Bins With the Strength of Pillars." Our bins will likely save you money on first cost, and certainly on maintenance.

SUPER-
CONCRETE STAVE
STORAGE BINS

NOT EXPORTED EXCEPT TO CANADA AND MEXICO.

The Neff & Fry Co. • 278 Elm St. • Camden, Ohio

Turning stone into dollars



Flexibility of Marcy CPD Mills Permits Production of Concrete, Mortar, or Asphalt Sand

Operating Advantages—Compared with crushing, experience has proved these additional advantages of grinding by Marcy CPD Mills:

Low Cost—low maintenance, less steel consumption and less power per ton result in an overall cost generally less than 25c per ton, exclusive of ammortization.

Flexibility—by varying rate of feed, pulp dilution, and discharge port area it is possible to change gradation of finished product to meet different specifications.

Wet or Dry Grinding—on dry grinding moisture content is not as critical as with other type crushers.

Cleaner Operation

Capacities—from 2 to 200 dry tons per hour

Marcy Center Peripheral Discharge Rod Mills have been earning profits for sand and gravel operators since 1925. Let our engineers, experienced in manufacture of sand, assist you on your problems.

WRITE FOR CATALOG

The Mine & Smelter Supply Co.
DENVER 17, COLORADO

*Both Marcy and Massco are registered trademarks.

shifting of the overload of gravel, which so changed the distribution of weight of the truck that its front wheels lifted from the ground in a sudden upending. It dislodged DeMichiel and threw him violently to the ground. DeMichiel was very seriously injured and sued Powell, the contractor, and the General Crushed Stone Company for heavy damages.

During the trial the testimony showed that the stone company had no control over Powell whatever, as Powell merely drove his truck to the stone company's quarry and had his truck loaded. In view of this testimony the higher court held the General Crushed Stone Company not liable in damages to DeMichiel. The higher court said:

"General Crushed Stone Company had contracted to furnish and deliver all stone needed for the job. The load of stone hauled by Powell was delivered in fulfillment of that contract. Here there is undisputed documentary evidence that General Crushed Stone Company sub-contracted the supplying of stone to an independent contractor. In these circumstances the evidence could not support the verdict against General Crushed Stone Company in the entering of judgment n.o.v. for that defendant. The judgment relieving General Crushed Stone Company of liability will be affirmed."

Also the testimony showed that the contractor merely paid Powell on a per ton contract basis and that this contractor had nothing to do with how Powell made the deliveries of rock, nor how much rock Powell hauled on each load. Hence, the higher court refused to award DeMichiel damages from the contractor. The court said:

"The Supreme Court has ruled that the mere fact that a defendant is a general contractor for a project does not make its liability a jury question if the evidence shows affirmatively and without dispute that another independent contractor was performing the particular work which caused the injury."

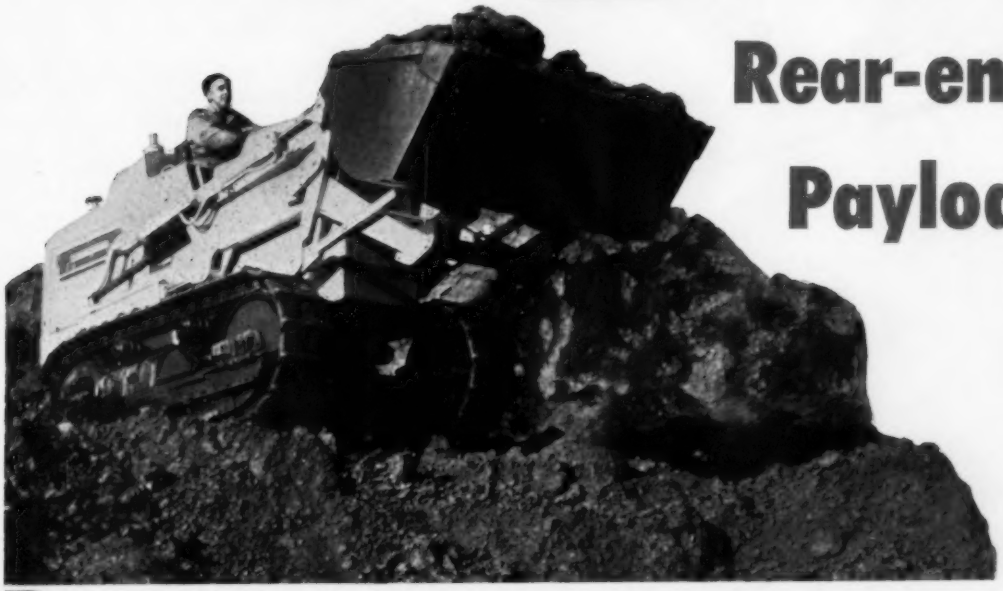
On the other hand, the higher court held Powell liable in heavy damages to DeMichiel and explained that since Powell was not a representative or agent of either the contractor or the General Crushed Stone Company. Powell was solely liable to DeMichiel because the proximate cause of the injury was Powell's voluntary act of overloading his truck.

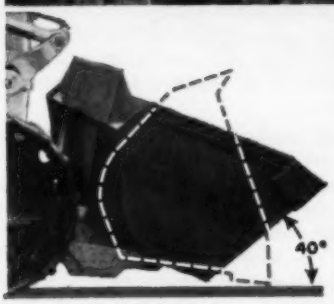
Must Pay Taxes

The president of a concrete block corporation submitted this question:

NOW . . . a loader which combines crawler traction with rubber-tired speed . . . a loader with unmatched visibility plus perfect balance

the all new International® Rear-engine Payloader®





Tremendous pry-out force is obtained by using breakout pads on ground as fulcrum for leverage. Load forces transfer to ground instead of to machine.

40° bucket tip-back at ground level permits digging of bigger bucket loads, plus retaining of more of load in bucket during lifting and carrying.

For *speed, maneuverability*, and *big capacity* in a crawler-loader, see the new International 1¾ yard Model 12 Payloader!

This amazing 77 net hp machine seats its operator *in front of the engine*, close to the bucket, where he can always see what he's loading, and where he's going. It balances the tractor between rear-mounted engine and front-mounted bucket. It distributes weight evenly over entire length of tracks, to give you better traction, longer track life, better stability on grades, less bogging down in spongy ground.

Your operator moves faster on the new Payloader, too. He can go up to *10 mph forward, 13 mph reverse*. He changes speeds or *direction* rapidly through a full-power shift, three-speed, full reversing transmission. He need hardly slow down or reduce engine power to shift gears. He gets maximum digging power from the machine's torque converter. And he steers easily, too, controlling each steering clutch and brake through one power-boosted *lever* (no foot steering brakes).

Try this new International Model 12 Payloader for yourself. Let us arrange a demonstration. Call soon! A good deal awaits you!

See you at the ROAD SHOW CHICAGO Jan. 28-Feb. 2, 1957

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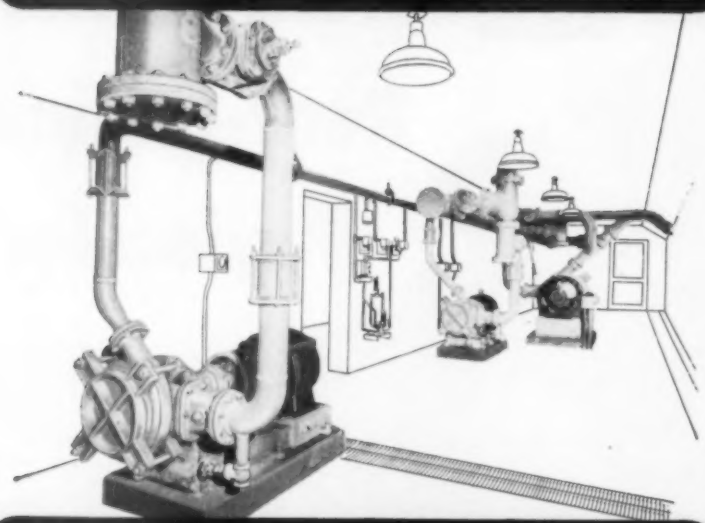
International® Construction Equipment

International Harvester Company, 180 North Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks.

Handles extremely thick slurries with high specific gravities



MORRIS Type R SLURRY PUMP

Heavy viscous slurries with solids ratios as high as 70% by volume are not unusual loads for a Morris Type R Slurry Pump.

A case in point is this Morris installation at the Missouri Portland Cement Co., St. Louis, Mo. The two Morris 3R Pumps in the foreground each handle 200 GPM of a cement slurry at 64% solids with 1.66 specific gravity. Speed is 1180 RPM. The 6R Pump in the background handles 600 GPM of the same slurry at 880 RPM.

Long operating life... little or no maintenance

Massive running parts of the Type R compensate for the increased load imposed by high specific gravities. Hydraulic passages are deliberately designed for high concentrations of solids—the result of careful study of wear patterns shown by pumps in the field handling all kinds of abrasive materials. Elimination of areas of throttling and turbulence assures uniform wear of all parts.

There are no internal studs or bolts—no troublesome internal joints and fits. The suction disc liner is merely *clamped* into position between disc and shell. The absence of high stress on the shell permits wide variations in its composition—including materials of high abrasive resistance—to resist wear and extend the operating life of the pump.

Let our engineers consult with you on your slurry pump problems. They'll give you the benefit of 88 years of pump-building experience. Or, write for Bulletin 181.

MORRIS MACHINE WORKS
Baldwinsville, New York
Sales Offices in Principal Cities

MORRIS Centrifugal Pumps

"Are stockholders of a corporation which transferred all of its assets to another corporation, in exchange for stock, and then ceased to do business and distributed the stock received to its own shareholders, liable as transferees under the Revenue Act?"

According to a late higher court decision the answer is yes, irrespective of whether or not the dissolved company issued stock directly to the stockholders of the other corporation.

This is so because Section 311 of the Internal Revenue Code, '26 U.S.C.A. 311 imposes upon a transferee of a taxpayer's property the full liability for taxes owing by the taxpayer, to the extent of the value of the property received by the transferee.

For example, in *Bates v. Commissioner of Internal Revenue,* 200 Fed. (2d) 21, it was shown that for many years Harry F .Chaddick was president of two corporations. The testimony showed that Chaddick owned 196 of the 306 shares of stock one corporation and all the stock in the other. Chaddick, as president of both corporations, dissolved one corporation and transferred all its assets to the other, known as the Standard Corporation. The latter, in exchange, issued shares of stock to the stockholders. The shares of Standard Corp. issued to Chaddick, as a result of the transfer, had a value of $21,303.

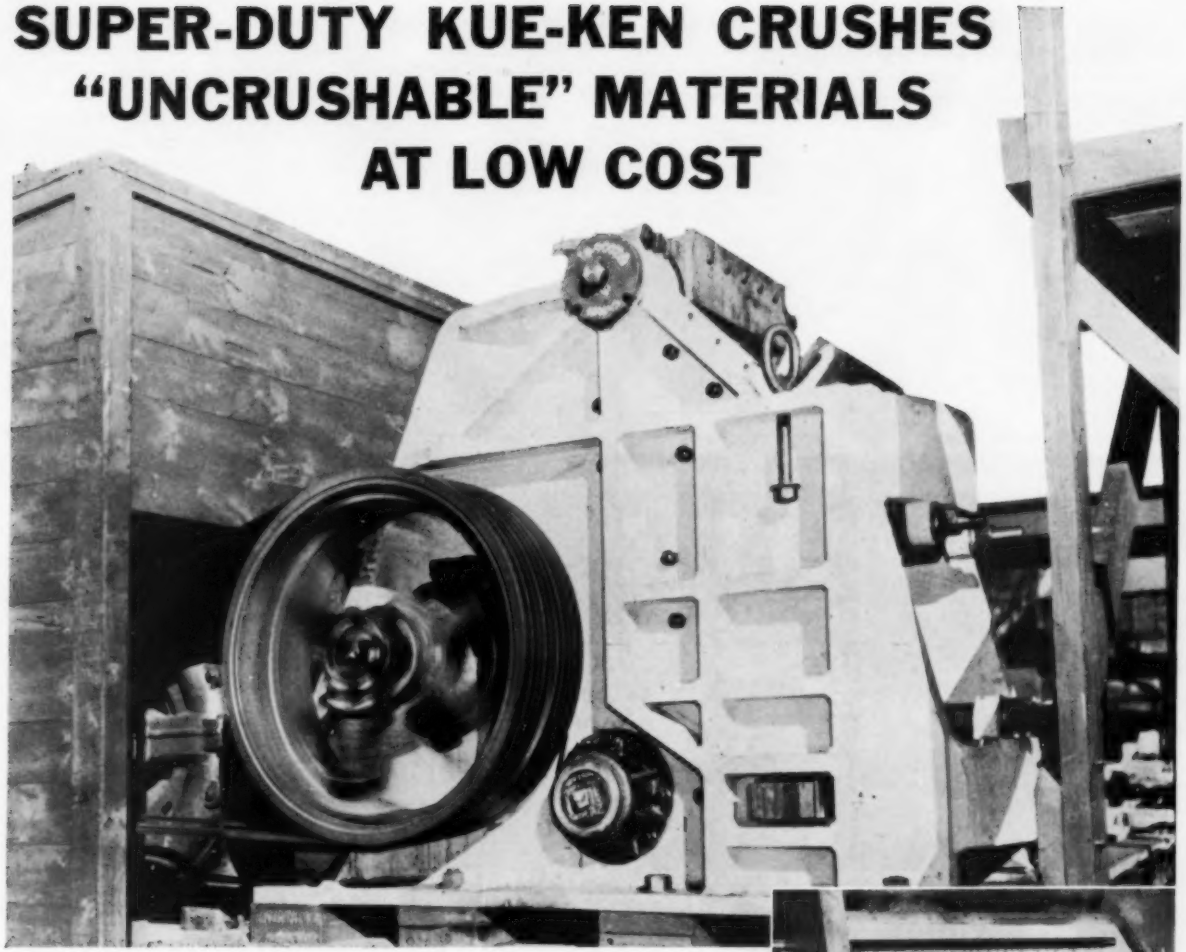
In subsequent litigation the higher court held that Chaddick was liable for payment of federal income taxes owed by the dissolved corporation. The court said:

The short cut employed by which Standard Corporation issued its stock directly to the stockholders of Bates Corporation in no wise relieved those stockholders of their liability as transferees of the assets of Bates Corporation."

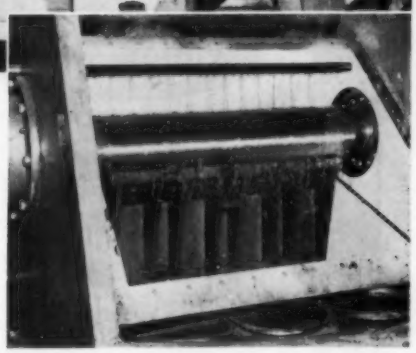
For comparison see *Hunn v. United States,* 8 Cir. 60 F. (2d) 430. Here the stockholders of a corporation received stock in another corporation upon a transfer of the assets of the former to the latter. The court held that the stockholders of the transferer corporation were liable for the taxes owing by it, to the extent of the value of the shares of the transferee corporation received by them.

This court also stated important law pertaining to the payment of federal income taxes on moneys received but not owned by a corporation or other taxpayer. The tax on

SUPER-DUTY KUE-KEN CRUSHES "UNCRUSHABLE" MATERIALS AT LOW COST



Ferro-vanadian, ferro-titanium and other "uncrushable" materials are crushed rapidly and at low cost by this Super-Duty Kue-Ken crusher. The powerful leverage available with Kue-Ken design and complete enclosure of mechanism in circulating oil bath gives performance previously considered impossible on this type of crushing. Power consumption is low. Overload protection is provided by automatic flywheel release that is quickly reset.



Self-Lubricating!

Kue-Ken toggles are machined, polished, flame hardened. They operate encased in a bath of filtered, dust-free oil that maintains their original micrometer tolerances for the life of the crusher. Photo shows Kue-Ken operating with cover removed to show filtered oil pouring over shaft, bearings and toggles.

WRITE FOR CATALOG

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KUE-KEN CRUSHERS

"LOWEST COST-PER-TON CRUSHING"

Jaw Crushers · Gyratory Crushers · Overhead Eccentric Crushers · Revolving Screens
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SAN ANTONIO, TEX. ..... Closner Equipment Co.
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LOS ANGELES, CALIF. ..... Garlinghouse, Fremon Co.
PHOENIX, ARIZ. ..... Stapley's
DENVER, COLO. ..... Union Supply Co.
CASPER, WYOMING ..... Moss Equipment & Supply Co.
VANCOUVER, B. C. ..... Universal Equipment Co.

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

such moneys must be paid.

Validity of Agency Contract

A reader asks, "Is a contract lawful by which a purchaser of merchandise is required by the seller to sell the merchandise at a stated price, and the purchaser is given an exclusive right or agency for the merchandise in a specified area?"

For instance, in *Whitwell v. Continental Company,* 8 Cir. 125 F. 454, a wholesaler sued a manufacturer under the Sherman Act on the ground that the manufacturer refused to sell merchandise to him at prices which would enable him to resell at a profit, unless he refrained from buying, selling, or handling the same kind of merchandise made by competing companies. This court said:

"The right of each competitor to fix the prices of the commodities which he offers for sale, and to dictate the terms upon which he will dispose of them is indispensable to the very existence of competition. Strike down or stipulate away that right, and competition is not only restricted, but destroyed."

This higher court explained that manufacturers who do not dispense articles of prime necessity, generally can refuse to sell their commodities at any price, or at specified prices.

Therefore, if the testimony shows that a restrictive or exclusive agency contract will not substantially create a monopoly in any particular line or classification of merchandise which is not a necessity, such a contract is valid.

Fencing in Natural Stream

Another reader asked this question: "Our company owns a ditch in which there is running water. In order to avoid future liability if children get drowned, must we enclose or fence in this ditch.

A few weeks ago, a higher court answered this question in the negative.

For illustration, in *Meyer v. General Company,* 280 Pac. (2d) 257, the testimony showed facts, as follows: At about noon a two-year-old boy left his home. He was unattended and on a tricycle. He traveled over 2,000 ft. to Thaver drive, a hard-surfaced thoroughfare parallel to and about 200 ft. from a ditch which was unfenced and easily accessible. Shortly thereafter, the boy's drowned body was taken from the ditch near the city limits. There were no houses near the scene and no eyewitnesses to the tragedy. The boy's parents sued the company which owned and maintained the ditch. The higher court held the company not liable, saying:

"The ditch in the instant case was not unnaturally dangerous, had no element of deception or of an inextricable trap, and, in fact, presented no danger by reason of being artificial that was different in any way from that of a natural watercourse. We hold, as a matter of law, that it was not an attractive nuisance."

For comparison, see the leading case of *Bjork v. City of Tacoma,* 135 P. 1005. In that case, a company used a wooden flume, with a cross section 2 ft. square, to carry its water supply. A cover had been nailed over the flume but in time the nails rusted away, the cover came loose, and had been missing for two weeks. The flume was near a regular playground for the children in the neighborhood. A three-year-old boy was sucked through the flume and was drowned. The court held the company liable in damages to the boy's parents and said:

"A distinction between an open flume carrying a stream of shallow water and an enclosed box such as is here maintained on premises used as a common playground in a populous city, may be soundly made, both

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. . . forged from ONE PIECE of Alloy Steel

NO WELDS TO BREAK . . .

Each SPANG WELDLESS JAR is forged from a single piece of selected alloy steel and is scientifically heat-treated and tempered to obtain proper hardness and toughness in the rein sections for maximum strength and wear resistance in the most severe drilling service.

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Quality-built for dependable, high-output stripping and loading...

the big, rugged LIMA Type 2400

It takes a big, rugged machine like the Type 2400 to give you fast, dependable, high-output stripping and loading service. This heavy-duty 6 yd. shovel is quality-built by Lima to stay on the job, deliver peak operating performance on the tough assignments. It's easily convertible for dragline operation, too.

Air operated clutches make the Type 2400 easy to handle. Wide, long crawlers give it plenty of bearing area for stability and maneuverability on soft footing. Tandem mounted drums give maximum cable capacity. These plus Lima's quality "extras" (see right) have made the Type 2400 a hands-down favorite with users around the world.

Get the full story on the quality-built Type 2400 today. See your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

COMPARE QUALITY! No other machine gives you as much as LIMA!

1. Piston-type dirt seal rings and retainers in crawler rollers.
2. Moving parts are flame or induction hardened for longer life.
3. Two-shoe swing and propel clutches; air control.
4. Anti-friction bearings at all important bearing points.
5. Big capacity drums and sheaves are easy on cables.
6. Propel and swing gears and power take-off are enclosed in a sealed oil bath.
7. Torque converter (standard equipment).
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

COMPARE and you'll specify LIMA for shovels (½ yd. to 6 yds.), cranes (to 110 tons) and draglines (variable). Smaller capacities available on rubber.

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Construction Equipment Division—LIMA WORKS

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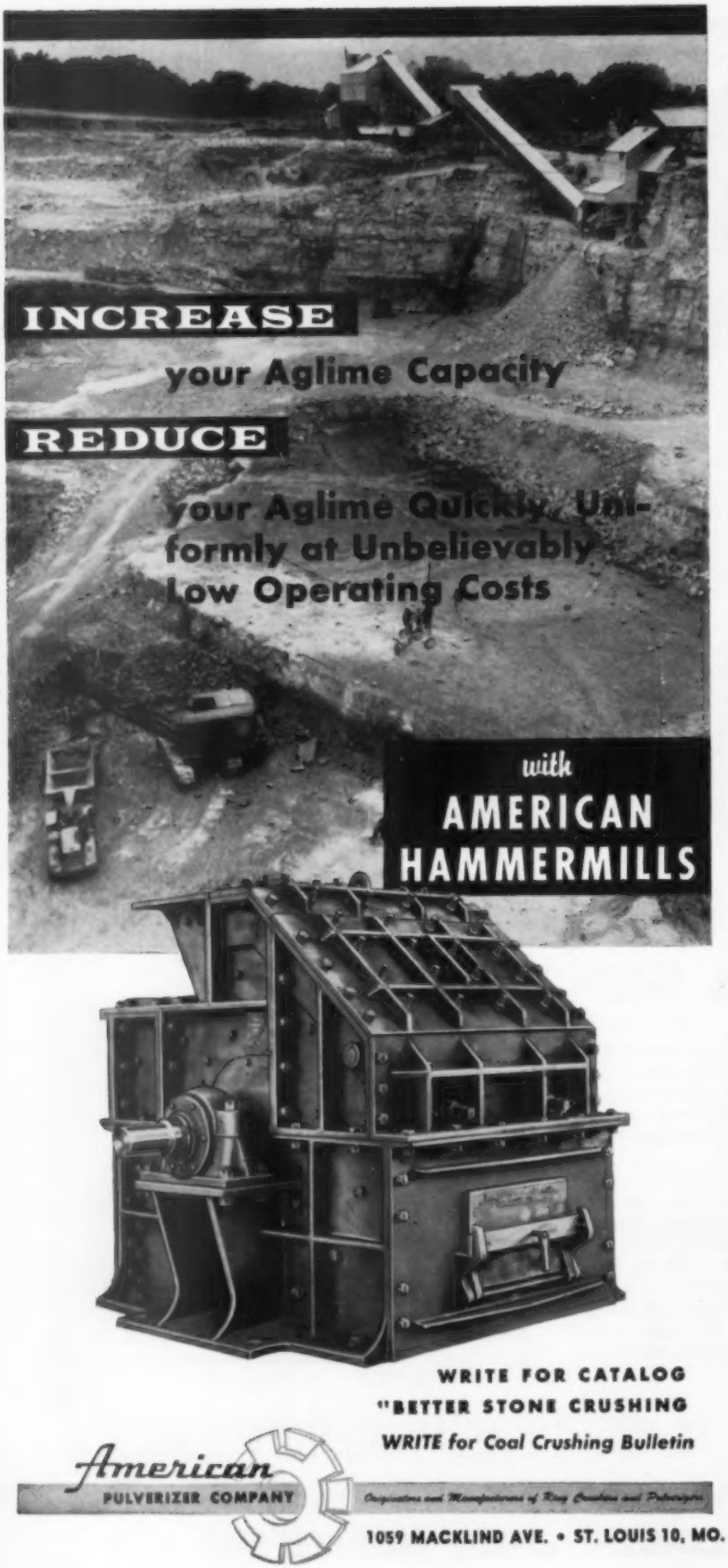

by reason of its location and its greater danger. A child falling into such a hole obviously had no chance either of rescue or escape."

This higher court went on to explain that a property owner need not fence in either a natural stream or canal of running water. This is so because all higher courts agree that a natural watercourse is not an "attractive nuisance."

Law of Adverse Possession

The following question was asked by a reader: "For some 30 years our company has been using a driveway. Now a property owner claims that this driveway is on his property and he has ordered us to discontinue its use or he will file suit. Can he stop our company from using this driveway?"

According to a late higher court decision the answer is no. Generally speaking, if for 21 years a person or company uses a driveway over property belonging to another person, firm, or corporation, he can continue the use by "adverse possession" laws. (However, this law is not applicable to property owned by a state, county, or city.)

For example, in *George v. Town of Bloomfield,* 73 Atl. (2d) 636, the testimony showed that for 40 years a sand and gravel company had used a driveway over and across the "public common" as a means of ingress and egress from its property. Later the city sued to prevent the company from using the driveway.

The higher court ordered the company not to use the driveway, saying that the city was not estopped to deny the use of a driveway over the park strip because of alleged continuous use for approximately 40 years, since the doctrine of "adverse possession" does not run against the state or its subdivision.

Mechanical Defects

A contractor asked: "If an insurance company issues a policy on a motor truck to cover damage to the truck caused by "collision with another object," can the insurance company avoid payment for damage when a wheel comes off?"

A few weeks ago, the higher court answered this question in the negative.

For illustration, in *Home Service Casualty Insurance Company v. H. D. Barry,* 277 S. W. (2d) 280, it was shown that a motor truck was insured against damage caused by "collision of the automobile with another object or by upset" of the automobile.

One day the right rear dual wheels of the gravel-loaded dump truck

came off as it was being driven down a slope of a roadway at 20 m.p.h. The right rear end of the truck struck the roadbed, extensively damaging the truck and its dump bed, so that the truck had to be turned over in order to right it.

In subsequent litigation the court held that the truck owner could recover from his insurance company the cost of repairing the truck. This was so although the insurance company contended that the damages sustained were due to wear and tear or to a mechanical breakdown or failure. The court said:

"The truck was traveling down hill at some 20 miles per hour and was loaded with approximately five yards of gravel . . . when the rear right wheels came off and the right rear end of the truck struck the roadbed. We think the trial court could reasonably assume that the weight of the gravel in the dump bed, as well as the speed of the truck and the down grade, contributed to the force with which the bed of the truck struck the roadbed."

This court explained that any insurance policy is a contract, and where the coverage is based upon loss due to a certain cause, the principles which in legal concept determine causation will ordinarily be applied in carrying out the intention of the parties. In other words, a person taking out insurance bargains for a certain protection, and for a consideration the insurer agrees to furnish that protection.

For comparison, see *Republic Casualty Company v. Mayfield,* 251 S. W. (2d) 764, and the cases there cited. A loaded dump truck was upset, and the court held that the upset was due to the load of the truck and the speed at which it was traveling. The truck owner was not covered by the insurance policy. Hence, the truck owner could receive no payment from the insurance company.

Unlocked Vehicles

According to a late higher court decision, if a motor truck is left unlocked, in violation to a clause in an insurance policy, the insurance company need not pay the theft loss for merchandise stolen from the truck.

For example, in *Universal Company v. The American Insurance Company,* 25 N. E. (2d) 643, the testimony showed facts as follows: A truck owner held an insurance policy which insured all merchandise in the course of delivery against the hazard of fire, flood, windstorm, collision, overturning of vehicle, and collapse of bridges. Also, the policy contained an added insuring clause against theft of merchandise resulting from "violent forcible entry" provided the doors were closed and locked when the forcible entry and theft occurred.

One day the driver of a truck turned off the ignition and got out of the truck, without locking the cab door. He went into a restaurant and when he returned, the truck was missing. When the truck was located, it was found that the contents of the truck had been stolen. The insurance company refused to pay the loss, and the truck owner filed suit.

The higher court held that the insurance company need not pay the loss to the carrier, saying:

"There is no good reason why an insured and insurer, for a consideration representing the value of a qualified risk, should not be permitted to contract as in the instant case."

Accidents Outside Scope of Employment

According to a recent higher court decision, an employee who suffers an injury or death while greasing the motor truck he regularly drives cannot recover compensation, under the State Workmen's Compensation Act, because greasing the truck is not within the scope of his employment.

For example, in *Neff v. Henry Wagner,* 281 Pac. (2d) 1109, it was shown that a man named Neff regularly drove a truck for the Henry Wagner Company. One morning Neff had no load to haul and put in his time greasing his truck, using a grease gun which weighed about 80 lb. and held 35 lb. of grease. The method of greasing the truck was to lie down on a scooter. While doing this work Neff suffered an injury. Soon he was unconscious and died. Neff's widow filed a claim for compensation for the death of her husband.

The higher court refused to allow the widow any compensation, holding that the accident did not rise "out of" the employment.

Unsigned Letters

A few days ago I received a letter as follows: "I wrote a letter and in it I agreed to purchase certain materials. However, I did not sign the letter, but only signed my initials. Can this seller hold me to the contract?"

Yes, you are liable on this contract. Furthermore, you would be liable although your signature had been typewritten, rubber-stamped, or printed.

MAKE BULLDOZERS DOUBLY EFFECTIVE

. . . . with PRECO *Back-Rippers*

These Preco Back-Rippers, mounted on the reverse side of the bulldozer moldboard, dig in and rip **while the tractor backs up.** They make blading easier and faster because they rip out rocks, roots and hard ground, enabling the tractor to work a full blade with less horsepower on its next trip. This is **double-duty bulldozing.**

Like contractors all over America, you can save time and money by using Preco Back-Rippers in building pioneer roads, clearing land and rights-of-way, in gravel pit operations, slate breaking in coal strip mines, for logging operations and mounted on pusher tractors for faster scraper loading.

See your Caterpillar Dealer or send the coupon for information.

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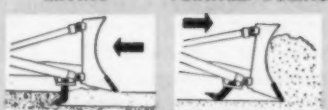
EASIER FORWARD DOZING



Preco Back-Rippers are completely automatic in operation — they dig in on the back-up trip and ride on the surface when going forward. There are no controls and, when desired, they can be locked up out of the way.

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This is so because the higher courts hold that any form of signature, such as that made with a rubber-stamp, typewriter, symbols, initials, and the like, may be valid and enforceable if it was the intention of the signee to be responsible when he affixed the signature.

Also, see *Meyers v. White*, 53 S. E. 447. In this case the higher court, when deciding the right of an employee to bind his employer by endorsing the latter's name with a rubber-stamp, said:

"Where the employer's name has been so placed by one having authority to do it and with intent to bind the employer, the contract is valid."

Stages of Silicosis

A reader wrote: "Please give me the law on silicosis, its stages, and when the employer is liable for payment of compensation to an employee who contracts the disease."

Three stages of silicosis are recognized by medical authorities: (1) In the first stage the earliest detectable specific signs of silicosis are present whether or not capacity for work is or has been impaired by such silicosis; (2) In the second stage physical signs of silicosis are present, and capacity for work is or has been impaired by the disease; (3) In the third stage performance of work is impossible, and death may result soon.

A modern court has held that compensation may be denied, although the employee is in the second stage of silicosis, if the testimony shows that his ability to work is not impaired.

For illustration, in *Staples v. State Compensation Commissioner*, 31 S. E. (2d) 433, an employee sued to recover compensation under the State Workmen's Compensation Act. He stated to the Industrial Commissioner that he was suffering from silicosis. Thereupon the commissioner awarded the compensation benefits in the sum of $1,000 for silicosis in the second stage.

The employer appealed to the higher court which, after reviewing the testimony, reversed the commissioner's decision and said:

"It suffices to say that the X-ray examination of the claimant (employee) demonstrates definite and physical signs of silicosis in its second stage, but the statutory requirement, relating to the impairment of capacity to work, does not appear from such examination, nor does it necessarily follow that such impairment exists by reason thereof."

Manufacturers' News

Carrol G. Turk, formerly with the Martin Machine Company, Kewanee, Ill., has joined the Thew Shovel Company, Lorain, Ohio. His major assignment will be coordinating staff functions between the engineering and service departments.

Mr. Turk had been vice-president in charge of engineering and production while with the Martin Machine Company.

J. A. MATOUSEK

C. G. TURK

John A. Matousek has been named assistant to the president of the Baker-Raulang Company, Cleveland, Ohio. In his new capacity he will aid on general staff problems and handle special assignments in fleet sales, new market and product programs, and industrial relations.

Mr. Matousek joined Baker-Raulang in 1950 as plant manager. Previously, he was division manager in Detroit for the Hupp Motor Corp.

Robert E. Spoerl has been appointed chief sales engineer for the conveyor and elevator belting department of United States Rubber Co., New York, New York.

Kaiser Aluminum & Chemical Corporation, Oakland, California, has announced its entry into national network television. Starting July 3 the company will sponsor a new live dramatic show on alternate Tuesday evenings from 9:30-10:30 (EST) over a National Broadcasting Company nationwide network of 115 TV stations.

Marking the company's first use of television on a national scale, Kaiser Aluminum will make its TV hour a showcase for aluminum products made by its customers and will demonstrate many of the new developments being made in aluminum to serve both industry and the consumer.

Caterpillar Tractor Co., Peoria, Ill., announces the appointment of E. C. Chapman as sales manager of the Eastern Division. He formerly was assistant manager of this division. W. E. McCoy, former sales manager of the Eastern Division, has transferred to the San Francisco office which is headquarters for the two western divisions.

Frank Foster, presently assistant sales manager of the Southwest Division, will transfer to the Peoria office to assume the duties formerly held by E. C. Chapman. Ralph Ehni, now serving as district representative in the Northwestern Division, will be assigned the duties formerly held by Mr. Foster.

Blaw-Knox Company, Pittsburgh, Pa., has announced a major integration of the firm's manufacturing operations and the appointment of two vice-presidents to manage the new groups.

S. J. Moran has been named vice-president and general manager of Foundry and Mill Machinery Operations and E. C. Rook is the new president and general manager of Fabricated Products Operations.

Mr. Moran joined Blaw-Knox in 1920 and his experience includes varied positions in foundry and machinery operations. For some years

S. J. MORAN

E. C. ROOK

he was vice-president-general manager of the Union Steel Castings Division and more recently was also in charge of operations at Lewis Machinery Division.

Captain Rook came to Blaw-Knox in 1914 as vice-president-general manager of the Blaw-Knox Equipment Division. During 34 years of naval service he gained extensive technical experience, including management of several large ordnance plants.

TWO GREAT NAMES

Teamed For Quality...Service...Progress

Two steelmakers, each known for its achievements in its own particular field of producing forged and annular rolled products are now combined to supply requirements of the largest and smallest. Two groups of production and research engineers are joined to better serve American industry. The new company is a totally owned subsidiary of Heppenstall and will operate independently. Each company will continue to offer American industry the custom made products for which it is famous.

MIDVALE - HEPPENSTALL CO.

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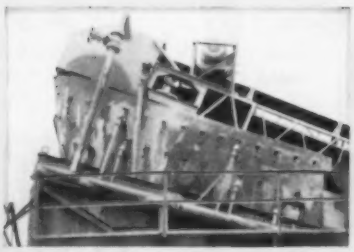
PHILADELPHIA 40, PA.

A SUBSIDIARY OF HEPPENSTALL COMPANY

PROFIT THROUGH ...WITH SIMPLICITY

A 4' x 12' and a 4' x 10' Triple Deck Model D Gyrating Screen, set in tandem, performs a final washing and sizing operation. The washed gravel is fed to five storage bins, so that any specification can be met by blending on the conveyor belt underneath these bins.



This Simplicity 5' x 14' Two Deck Model D Gyrating Screen takes its feed from the raw material stock pile via conveyor. All decks have washing sprays. The three products produced of sand and gravel are fed by conveyors to individual stock piles.

Aggregate is carried right from the pit to this Simplicity 3' x 8' Model BG Heavy Duty Scalping Screen. Fines are screened through to the conveyor below, while oversize is scalped to crusher.

ACCURATE SIZING GYRATING SCREENS

4,500 tons of aggregate a day is classified by four Simplicity screens at Holly Sand and Gravel, near Holly, Michigan

Working two shifts of 9 hours each, the Holly Sand and Gravel Company is daily processing 4,500 tons of aggregate, and the firm's General Manager expects to exceed this total in the near future. All this material is sized on four Simplicity screens. Simplicity Model D Gyrating Screens and a Model BG Scalping Screen efficiently and accurately classify the aggregate into grades 10A, 6A, Pea Rock, Torpedo Sand, and Mason Sand. This fast and accurate sizing is typical of the performance of Simplicity Screens throughout the aggregate industry. In addition, a 3' x 6' Model C Single Deck Screen has recently been installed to produce 100% clean Pea Pebbles, by eliminating the buckshot. The Simplicity Gyrating Screen is the original type of mechanically vibrated screen using the counterbalanced eccentric shaft. The counterbalance is machined directly on the shaft, thus giving positive action with perfect smoothness.

Simplicity Gyrating Scalpers are heavy-duty machines built on the same basic principles as the Gyrating Screens, but with a grizzly deck to scalp off the oversize rock. These units are designed to withstand terrific impact. They perform two jobs at once by feeding the oversize into a crusher, and screening the fines.

Wherever you need fast, efficient scalping, screening, or feeding in your aggregate operation, Simplicity equipment can be a big help to you . . . write us today for complete information.

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ENGINEERING COMPANY • DURAND 12, MICHIGAN

SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.
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FOR EXPORT: Brown and Sites, 50 Church St., New York 7, N. Y.

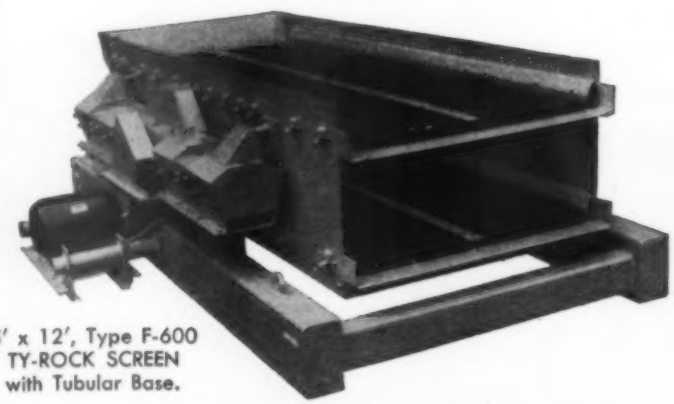
Stuart H. Smith, general sales manager of S K F Industries, Inc., Philadelphia, Pa., has been elected a director of the Tyson Bearing Corporation, Massillon, Ohio, a subsidiary of S K F. He replaces William S. Mahoney, formerly executive vice-president and a director of Tyson, who has resigned.

Caterpillar Tractor Co., Peoria, Ill., has announced the formation of a new parts depot near Miami, Fla. The depot, to be located in nearby Hialeah, northwest of Miami, will provide emergency service for south Florida and Export dealers.

Purchase of a 176-acre tract of land near Monroeville, Pa., as the site for a new multi-million dollar research center has been approved by the Board of Directors of Koppers Company, Inc., Pittsburgh, Pa.

The land, located on a high plateau just east of the Pittsburgh Interchange of the Pennsylvania Turnpike and north of William Penn Highway was recently re-zoned by the Borough of Monroeville for institutional development. Transfer of the property, which is being purchased from Sampson Miller Associated Companies, Inc., will be completed within the next few weeks.

FOR PROFITABLE SCREENING
USE



5′ x 12′, Type F-600
TY-ROCK SCREEN
with Tubular Base.

TYLER VIBRATING SCREENS
AND
TYLER WOVEN WIRE SCREENS

There is a Tyler Vibrating Screen for every sizing and dewatering job. Tyler Screens are noted for the huge tonnages handled with top efficiency and low cost per ton.

Tyler Woven Wire Screens are made in all meshes and metals in over 10,000 different specifications. Top-Cap and Ty-Rod Screens with the long-slot openings provide the greatest capacity for a given discharge area.

THE W. S. TYLER COMPANY
CLEVELAND 14, OHIO
Manufacturers of Woven Wire Screens and Screening Machinery

Two specialists with outstanding backgrounds in heavy equipment have joined the sales management staff of R. G. LeTourneau, Inc., of Longview, Texas.

Rodney A. Kox has been appointed to head sales activities of LeTourneau off-road transporters and cross-country freighters, working out of the company's general offices at Longview. He formerly was southwestern zone manager for Four Wheel Drive Auto Co. and later owner-manager of the Texas FWD Truck & Equipment Company.

Thomas W. Miller has been appointed to head sales of the company's growing line of logging products. He will work closely with the company's established logging distributors, and will maintain headquarters at Portland, Ore.

D. A. Zupa, sales manager of Bergen Machine & Tool Co., Inc., Nutley, N. J., has announced the following appointments to Bergen's Field Sales Staff: Ivan W. Benson, Dectaur, Georgia, will represent the company in Georgia and Alabama. Don Bush, Miami, Fla., who formerly covered several states in the southeast, has been assigned to cover only Florida. Karl Eggerth, who formerly represented the company on the west coast, has been assigned to cover North and South Carolina and a portion of the southwest.

Recently appointed Koehring products distributor in Southeastern Texas, the Cactus Equipment Company of Houston will handle the complete line of Koehring heavy duty construction equipment along with products of three Koehring subsidiary manufacturers: Parsons Company, C. S. Johnson Company, and Kwik-Mix Company. Under the management of S. A. Witte, Cactus Equipment Company succeeds F. S. Ray Co. as the Koehring representative in the area.

A 75 per cent increase in USA sales of *DEUTZ* air-cooled diesel engines, manufactured by Kloeckner-Humbolt-Deutz AG. of Cologne, Germany, for the months of January 1st to April 30th, 1956 (as compared to the same period of 1955), has been reported by R. D. Friedlander, general sales manager of Diesel Energy Corporation, New York City, United States representative and importer of *DEUTZ* air-cooled diesel engines.

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GENERAL

gets the work done *FASTER* at *LOWEST* cost!

ONLY GENERAL GIVES YOU STRONGER-THAN-STEEL NYGEN® CORD FOR EXTRA PROFIT ON THE JOB!

Every hour of every day, in quarries and strip mines, on logging and construction jobs the nation over, The General Tire proves its reputation for toughness, strength and dependability.

Delivering deep-down driving traction and high flotation *plus* Nygen Cord protection against job hazards, The General Tire continues to get the work done faster at lowest cost wherever it operates!

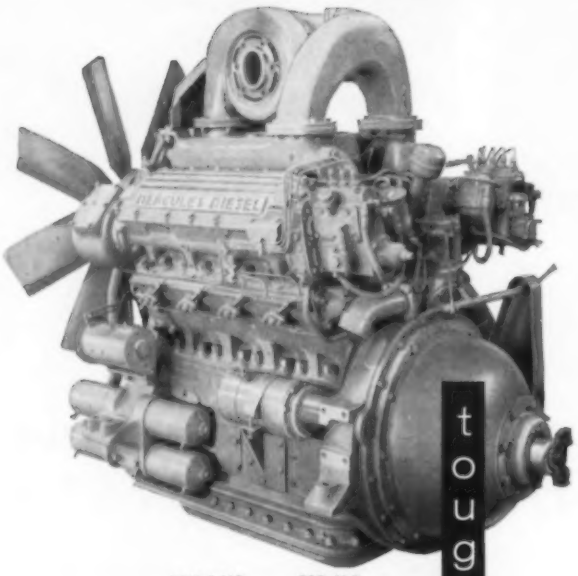
THE GENERAL TRUCK TIRE

Specify GENERALS *on your new equipment*

THE GENERAL TIRE & RUBBER COMPANY • *Akron, Ohio*

THREE MORE **HERCULES** ENGINES

TCD's



TCD-1468 500 H.P.

tough

compact

dependable

TCD-501 180 H.P.

TCD-895 318 H.P.

Turbo Charged Diesel

Following the Hercules policy of
providing industry with the latest in engine developments,
the above Hercules TCD's are available for applications requiring
Tough Compact Dependable power. Complete details on these TCD's are
available from the factory. Write for Bulletins
D-534, D-561 and D-567.

HERCULES MOTORS CORPORATION
CANTON, OHIO

H. D. Foster, sales manager of Goodyear Tire & Rubber Company's Industrial Products Division, Akron, Ohio, has retired after 43 years of service.

Mr. Foster was named district manager of Goodyear's Birmingham, Ala., office in 1915. He was transferred to the Cleveland, Ohio, district in 1917 and made manager of that district in 1938. He returned to Akron in 1941 as Eastern sales manager for the division and was named sales manager of the entire division in 1947.

Seth M. Snyder has been appointed manager of the Charlotte, N. C., district sales office of the Babcock & Wilcox Company's Boiler Division. The Charlotte sub-office has been elevated to full district office status.

Mr. Snyder joined B & W as a draftsman in Barberton, O. Subsequently he worked in production, studied under the company's engineering apprentice program, and gained experience in the erection, service and contractual phases of the boiler business. In 1939, he joined the company's Atlanta, Ga., sales organization, and moved to the Charlotte sub-office in 1946.

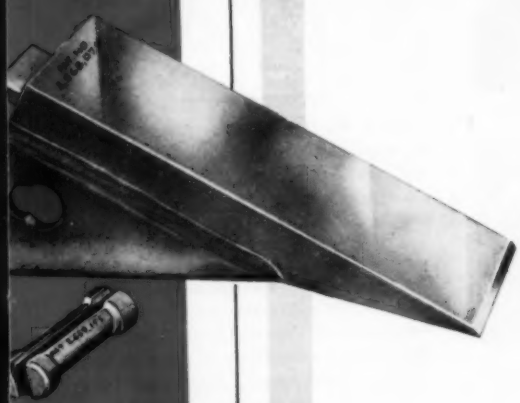
S. M. SNYDER

L. C. BLACK

Lewis C. Black has been appointed sales manager Large Machines, for Bucyrus-Erie Company, South Milwaukee, Wis. He succeeds R. M. Dickey, who resigned recently. He will be responsible for all domestic sales of quarry and mine machines, walking draglines, stripping shovels and draglines, and railway cranes, and will report to L. E. MacDonald, general sales manager. He joined Bucyrus-Erie as a special apprentice, and has been with the company ever since.

Thor Power Tool Company, Aurora, Ill., has opened a new Kansas City factory sales and service branch occupying a new building just completed at 606 West 17th Street. E. C. O'Connell, formerly manager of the Thor branch in San Francisco, has been appointed manager of the new branch.

25 YEARS EXPERIENCE



MANUFACTURING

FORGED ALLOY STEEL

Teeth that really dig

H & L TOOTH COMPANY

1540 SOUTH GREENWOOD AVE. MONTEBELLO, CALIFORNIA

McCARTHY
NEW HEAVY-DUTY VERTICAL AUGER DRILL

**Strip Miner Drills 8-1/2" Blast Holes 60 Ft. Deep in 1 Hour, Including Moving Time.*

Savings, like costs, are measured by the foot, especially in tough earth and rock formations. Using the new McCarthy 106-24 Vertical Drill, this Pennsylvania strip miner cut drilling time to 1 hr. per hole (including moving time) on 60-ft. blast holes 8½" in diameter. Formation was 20 ft. of soft top strata, 35 ft. sandstone and 5 ft. of hard sandstone and bastard limestone.

A new speed reducer on Model 106-24 slows auger rotation for drilling harder rock formations. The result is more torque, or "biting power." You have fewer bit failures, cutting over-all drilling time. Driller above used tungsten carbide bits.

The McCarthy Model 106-24—"World's Fastest Heavy-Duty Vertical Auger Drill"—handles augers from 3" to 24" in diameter.

Write for Bulletin M-100

THE SALEM TOOL CO.
1901 S. ELLSWORTH AVE.
SALEM, OHIO • U. S. A.

The Heltzel Steel Form and Iron Company of Warren, Ohio, recently announced the appointment of Kenneth Simpson as district representative in eleven western states.

He was formerly employed with the Noble Company and Standard Steel Company both in California.

His main office is located in Redondo Beach, Calif. There he will be handling Heltzel and Flexible's complete line of products.

K. SIMPSON

R. B. DASCH

Hamilton Rubber Manufacturing Corporation, Trenton, N. J., announces the appointment of Raymond B. Dasch as advertising manager. Mr. Dasch comes to the company from Arndt, Preston, Chapin, Lamb & Keen, Philadelphia, Penn., where he served as an advertising agency account executive.

Mr. Dasch has been assigned to the company's main office in Trenton, N. J. He will be responsible for advertising planning and execution, with strong emphasis on sales promotion and merchandising.

The appointment of Paul P. Smongeski to the newly created position of manufacturing engineer is announced by Marion Power Shovel Company, Marion, Ohio.

As manufacturing engineer, Mr. Smongeski will work closely with Marion manufacturing and engineering departments in coordinating product development and production.

Mack Trucks, Inc., New York, N. Y., will merge several of its wholly-owned subsidiary companies under the parent name.

Mack affiliates that will be merged under the name of Mack Trucks, Inc., includes the Brunswick Ordnance Corporation; Mack Manufacturing Corporation; Mack Motor Truck Corporation; Mack Motor Truck Company; Mack Brothers Motor Car Company, and International Plainfield Motor Company.

Two other Mack subsidiaries, Mack Trucks of Canada, Limited, and Mack Electronics Division, Inc., will retain their present identities.

J. F. D. Rohrbach, president of Raybestos-Manhattan, Inc., Passaic, New Jersey, announces the following appointments:

H. H. Burrows, senior vice-president of Rubber Sales Division. He joined the Manhattan Rubber Division in 1915, later became manager of the Roll and Tank Department, sales manager of Industrial Rubber Products Division and was appointed a vice-president of the Corporation in 1955.

R. B. Hazard, vice-president and sales manager-Rubber and Packings. He started in 1945 as a sales representative of the Packing Division of Minneapolis, became manager Distributor Sales in the Western District located at Chicago and assumed the sales managership of the Rubber and Packing Divisions in 1955.

John K. Gibson has been named an application engineer for cement and pyro-processing sales in Allis-Chalmers processing machinery department, Milwaukee 1, Wisc.

Carl R. Rolf has been elected executive vice-president of Pioneer Engineering Works, Inc., Minneapolis, Minn., subsidiary of Poor & Co., Chicago, and Roy L. Slama has been appointed comptroller.

Mr. Rolf formerly was first vice-president. During his more than 25 years service with the company, he had been salesman, assistant sales manager, sales manager and vice-president in charge of sales.

C. R. ROLF

R. L. SLAMA

Mr. Slama came to Pioneer in 1950 from Poor & Company, and has served as assistant secretary, assistant treasurer since that time, a position he now holds in addition to his appointment as comptroller.

Jack A. Yoblin, former research metallurgist, Titanium Metal Corp. of America, was recently appointed carbide products developments engineer for Carboloy Department of General Electric Company, Detroit, Mich.

A number of personnel changes in the purchasing department of Blaw-Knox Company, Pittsburgh, Pa., have been announced.

Harold F. Fiegenschuh, who has been director of purchases for the Continental Foundry and Machine Division, has retired after 44 years with the organization.

D. S. McCleary has been advanced to assistant director of purchases. He was formerly Pittsburgh District purchasing agent for Continental Foundry and Machine, having joined the organization in March 1952.

Promoted to staff purchasing agents are the following: Wayne Rawley, Jr., formerly assistant to the director of purchases; H. P. Bork, formerly Rolls Division purchasing agent, and B. R. Lauer, formerly Chicago District purchasing agent for Continental Foundry and Machine.

John L. McCaffrey has been elected chairman of the board of directors and chief executive officer of International Harvester Company, Chicago, Ill. At the same time, Peter V. Moulder, formerly executive vice-president, was elected president of the company to succeed Mr. McCaffrey.

Frank W. Jenks, formerly vice-president in charge of merchandising services, was elected executive vice-president.

Harry O. Bercher, formerly vice-president in charge of the steel division and purchasing and traffic, was elected executive vice-president.

The Cleveland office of Robertshaw-Fulton Controls Company has moved into new, larger quarters at 6116 St. Clair Avenue.

Two new Louisiana dealers have been appointed to handle the Michigan line of the Construction Machinery Division of Clark Equipment Company, Benton Harbor, Mich.

E. C. Ray Machinery Company, Highway 80, Shreveport, La., has been named to sell and service the Michigan line of tractor shovels and excavator cranes in the Louisiana parishes of Caddo, Boosier, Webster, Claiborne, DeSoto, Red River and Bienville.

General Equipment, Inc., 435 Richland Ave. at Government St., Baton Rouge, La., has been appointed to sell and service Michigan Tractor Shovels and Excavator Crane parts only.

Yes, an OWEN BUCKET swung from any crane boom will always give you:

FASTER Penetrating ACTION
when handling aggregate and loose materials;

FASTER Digging ACTION
with variable, multiplied closing power for excavation;

FASTER Loading ACTION
by reason of correctly engineered bowl designs with balanced power on each jaw;

FASTER Discharge ACTION
The combination of adjustable reeving and weight concentration in area surrounding lower sheave block exerting a direct pull on the cable, results in quicker opening and faster dumping.

"A mouthful at every bite"
BUCKETS AND GRAPPLES
Write for Catalog
THE OWEN BUCKET CO.
6050 Breakwater Avenue • Cleveland, Ohio
Branches: New York, Philadelphia, Chicago, Berkeley, Calif., Fort Lauderdale, Fla.

Yuba designed this screen for long life, minimum maintenance. Inner and outer screens easily renewed. Can be lubricated from outside.

HEAVY-DUTY SCREENS MADE TO FIT YOUR NEEDS

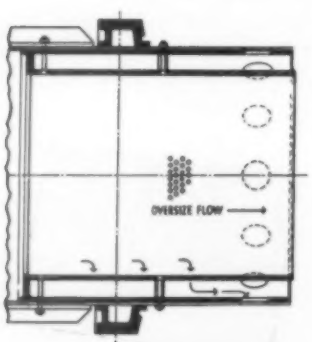
Flat or revolving • long-wearing non-clogging • competitively priced

—order from YUBA

For example – this double-jacketed screen, 35′ long and 8′ in diameter, washes and screens three sizes of sand simultaneously. Yuba-built screen plates are made from Abrasion Resisting Steel plates with a hardness ranging up to 250 Brinnell. This is a high carbon, high manganese alloy steel produced especially for screening purposes. In many places, screens of this tough, abrasion resisting steel last twice as long as ordinary screens. Naturally, this reduces downtime and replacement costs.

Yuba taper-drills screen holes to prevent clogging (unless you request straight sides). Holes can be as small as 3/16″ diameter; closely spaced for screening monazite sands and other rare earths. Thicknesses from 3/16″; length, diameter and other dimensions to suit your needs. Yuba screen plates are rolled true and cut square to close limits – insuring proper fit and fast installation.

Yuba stocks abrasion resisting steel in many thicknesses, usually can make prompt delivery. Try long-wearing, non-clogging Yuba screens now. For estimates, send screen details, hole sizes and spacing. No obligation. Wire, write or phone TODAY.



Yuba-built Olsen trommel increases screen capacity as much as 25%, by converting lower end blank shell plates into screening area . . . does not increase screen length.

102

YUBA DRIDGES

YUBA MANUFACTURING CO.

Room 651, 351 California St., San Francisco 4, California, U. S. A.

AGENTS { SIME, DARBY & CO., LTD. • SINGAPORE, KUALA LUMPUR, PENANG.
SHAW DARBY & CO., LTD., 14 & 19 LEADENHALL ST., LONDON, E. C. 3.

CABLES: YUBAMAN, SAN FRANCISCO • SHAWDARBCO, LONDON

Easton Car & Construction Company of Easton, Penn., has announced the appointment of George Sines as chief engineer of the company's Industrial Car Division. His background covers thirty-seven years of practical experience in the design and manufacture of industrial cars and earth moving equipment, starting with his job as blue print boy with Kopper in 1919.

Mr. Sines joined Austin-Western Company in 1930, and in 1939 was made chief engineer of the Car Division. His work with Austin-Western also covered that company's earth moving equipment. In 1951 he become associated with Lakeshore Engineering Company where, until joining Easton Car, he served as assistant vice-president.

G. SINES

L. S. RALPH

Appointment of Lee S. Ralph as sales manager of the Chase Bag Co., St. Louis branch, has been announced.

Mr. Ralph moves from the New York sales office of Chase Bag, where he has been located since 1953. He has had wide experience in the bag business, and will coordinate the sale of textile bags, Chase Polytex bags and liners, Chase Sharkraft and a complete line of other packaging products distributed by Chase in the St. Louis territory. This includes portions of Missouri, Iowa, Illinois, Indiana, Kentucky, Tennessee and Arkansas.

The Bayless-Kerr Company, Cleveland, Ohio, announces the election of Neville Bayless as president; Harry F. Falls as executive vice-president and Louis A. Schweizer as secretary.

James H. Wilson, president of the Salem Tool Company, Salem, Ohio, has announced the following management appointments:

J. H. Wilson, Jr., works manager; George Adams, chief engineer; Vincent J. McCarthy, sales manager; Kenneth Rogers, office manager; Raymond Lowry, plant superintendent; Donald Thomas, parts manager and Frank S. Painter, purchasing agent.

"They were blasting right outside the window but we never lost a teacup!"

SAYS MR. V. H. SHUSTER, OWNER
VAN CLEVE CHINA & GLASS CO.
MILFORD, CONN.

Photo shows nearness of Connecticut Turnpike blasting operations to the Van Cleve China & Glass shop.

FOR GOOD COMMUNITY RELATIONS . . . "GOOD-WILL" TECHNIQUES IN BLASTING

Today, your blasting must be so precisely planned that the business and family life of the community can go on without disruption.

Realizing the importance of good community relations to your business, AMERICAN's engineers have developed blasting procedures that we call "Good-Will" techniques. These techniques are at your service, to help you attain maximum blasting efficiency and at the same time minimize the effects of noise, vibration, and shock.

AMERICAN's engineers are trained specialists, always ready to assist you in the selection and use of our high-grade materials. Their skill and expert understanding of the best techniques in blasting are part and parcel of the many services you obtain when you are an AMERICAN customer.

AMERICAN plants and magazines are conveniently located for quick delivery direct to your operation.

THE AMERICAN LINE:

High Explosives	Electric Blasting Caps
Permissibles	Instantaneous
Blasting Powder	Regular Delay
Blasting Caps	Split-Second Delay

Blasting Accessories

If it's AMERICAN, it's dependable!

CYANAMID

AMERICAN CYANAMID COMPANY
EXPLOSIVES DEPARTMENT
30 Rockefeller Plaza, New York 20, N.Y.

Sales Offices: New York City, Latrobe, Pa., Pottsville, Pa., Scranton, Pa., St. Louis, Mo., Bluefield, W. Va.

an ACCO product

It pays to specify Tru-Stop Brakes

They give you—

Real emergency braking

•

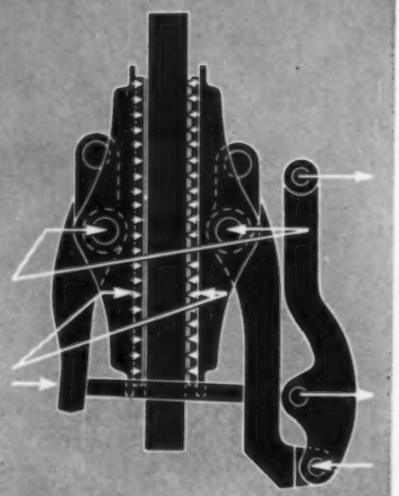
Smooth, positive stops

•

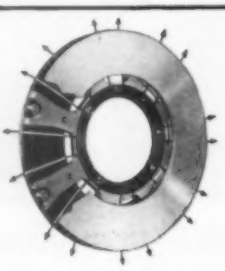
Safe parking

•

Lower service costs



TRU-STOPS are real emergency brakes—not just parking brakes. They serve as auxiliary brakes on long down-grades and can bring the vehicle to a smooth, quick stop if service brakes should fail suddenly. TRU-STOPS can do this and more. They can handle the vehicle with safety so that it can be removed from the road.



Air-Cooled

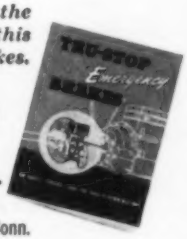
• The terrific heat generated in braking shortens lining life. TRU-STOP design quickly dissipates this heat. Most of the disc is exposed to the air even during braking. And a jet of cooling air circulates between the disc blades and carries off heat.

Smooth, positive stops are assured as the pressure is in direct proportion to the pull on the brake lever. There is no dangerous self-energizing or "over-braking."

TRU-STOPS hold on grades for safe parking. They prevent parking brake accidents.

Lower service costs come from the fact that TRU-STOPS are mounted directly on the drive shaft. Their simplicity of design and accessibility reduce maintenance requirements. Relining or adjustment is a simple job for any mechanic with ordinary tools. It is not necessary to drop the drive shaft.

Specify TRU-STOPS for factory installation on the next vehicle you buy. Send for your copy of this booklet—the complete story of TRU-STOP Brakes.



ACCO

TRADE MARK

Automotive and Aircraft Division
AMERICAN CHAIN & CABLE

601 Stephenson Bldg., Detroit 2
2216 South Garfield Ave., Los Angeles 22 • Bridgeport 2, Conn.

International Harvester Company, Chicago, Ill., has announced the following management changes in advertising and sales promotion activities:

Michael F. Peckels, former manager of the consumer relations department, was named director of consumer relations. He will be responsible for the operation of the sales operation research and the consumer relations departments, as well as for the operator manual and parts catalog functions. He joined Harvester in 1915.

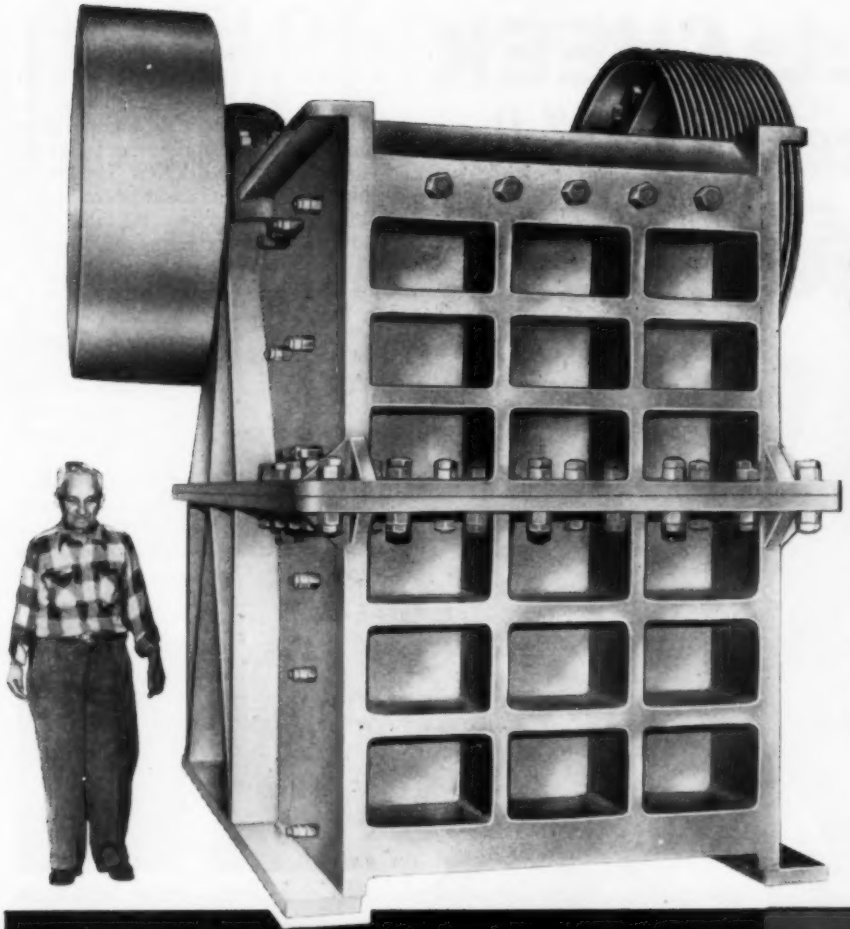
William O. Maxwell, formerly assistant manager of the consumer relations department, was promoted to manager of the department. He came to Harvester in 1941 as a general assistant to the supervisor of advertising, after being in advertising agency work.

Franklin W. Zimmer, 49, sales manager of Manitowoc Engineering Corp. Crane Division, Manitowoc, Wisc., died recently of a heart attack while golfing at Elks Country Club in Manitowoc. He joined Manitowoc Shipbuilding, Inc., in 1928. Before his appointment as sales manager of the Crane Division in 1952, he served as production manager and as assistant sales manager of that division.

John A. Bell has been appointed a district sales representative for three divisions of H. K. Porter Company, Inc.: Leschen Wire Rope, Quaker Rubber, and Henry Disston. His territory includes North Dakota, and northern Minnesota, Wisconsin, and Michigan.

William S. Richardson, president of the B. F. Goodrich Company, Akron, Ohio, recently was elected chairman of the National Highway Users Conference, succeeding Albert Bradley, chairman of the board of General Motors.

Appointment of Jack G. Errion to the position of assistant to the domestic sales manager was announced today by John W. Schoen, vice-president and general sales manager of LeTourneau-Westinghouse Company, Peoria, Ill. Mr. Errion, who has been serving as sales promotion manager for the firm, will direct the company's sales training program as well as assist W. E. Hendricks, domestic sales manager, in domestic sales activities.



New!
40" x 48"
Jaw Crusher

ROGERS JOPLIN

This newly designed crusher has a generous 40" x 48" feed opening and incorporates such features as bearing retainers (or sleeves) which facilitate quick bearing removal by hydraulic means, stress relieved sectionalized frame, heavy cast steel box section and double heat treated swing jaw.

Announcing ROGERS KING SIZE CRUSHER

The Oversize Opening of this Machine Offers:

A. Economy in blasting.
B. More efficient shovel operation.
C. Reduced bridging of material at crusher opening.
D. Assurance of maximum, continuous production.

ROGERS extra long jaws, engineered crushing action, rugged construction and low maintenance add up to extra profits.

ROGERS JOPLIN

R-102

Write today for all the facts on the Complete Line of ROGERS Machinery for Pits, Mines and Quarries

ROGERS IRON WORKS COMPANY

Joplin, Missouri

FARRELL-CHEEK

"One Source Supply" for ELEVATING and CONVEYING NEEDS

FARRELL-CHEEK STEEL CO.

HIGHEST QUALITY ELECTRIC FURNACE CARBON AND ALLOY STEEL CASTINGS

FARRELL'S CARBON STEEL CASTINGS	**RAILROAD CASTINGS** Locomotive and Car R. R. Specialty Castings	**GEARS AND PINIONS** "True Tooth" Gears and Pinions, Sheaves and Wheels.	**STOKER PARTS** Feed Screws, Furnace Tools, Flanged Pipe, etc.
F-C HARD EDGE STEEL CASTINGS	**ELEVATOR, CONVEYOR PARTS** Sprockets, Traction Wheels, Chains, Buckets, Rollers, Idlers, Bushings.	**CRANE WHEELS** Overhead, Gantry, Mono-rail, Ingot Car, Charging Machine.	**HEAVY HARDWARE** Complete Line Wire Rope Fittings and Cutters, Bar Benders and Cutters.
F85 STEEL CASTINGS			

YOUR INQUIRY WILL PROMPTLY BRING DETAILED INFORMATION PERTAINING TO ANY OF THE ABOVE FARRELL-CHEEK PRODUCTS

SANDUSKY, OHIO

Western Precipitation Corporation, Los Angeles, Calif., has announced the appointment of E. J. Sill as procurement manager, in which capacity he will be responsible for purchasing, production, traffic and other related duties. He joined the organization some eight years ago as a production specialist and subsequently was promoted to production manager.

Jack R. DeBacher has been elected a full vice-president of Thor Power Tool Co., Aurora, Ill. His activities will encompass every phase of the company's business of centralization of all Thor manufacturing, sales and engineering divisions.

Mr. DeBacher has been executive vice-president of the Thor Speed-Way Manufacturing Division at Cicero since 1955, and was formerly vice-president of sales. He joined SpeedWay in 1939.

J. R. DeBACHER

W. B. DICKERSON

W. B. Dickerson has been appointed district sales representative for Euclid Division, General Motors Corporation, for California and Nevada (except Elko and White Pine counties). He will make his headquarters at the Euclid Regional office in the Syndicate Building, Oakland, Calif., with M. H. Johnson, western regional manager.

Prior to his new assignment, Mr. Dickerson was district sales representative in the Seattle, Wash., area. He joined Euclid in 1953 as a field engineer in the sales development department.

West Winds, Inc., 1035 Battery Street, San Francisco, Calif., and Keystone Engineering Company, 1444 So. San Pedro Street, Los Angeles, Calif., have been selected by Nordberg Manufacturing Company, Milwaukee, Wisc., as authorized dealers.

Through these localized repair facilities, *Symons* Cone Crushers or parts which may require repair and overhaul, will be reconditioned through strict adherence to original factory standards, tolerances, and proper fit of replacement parts.

CONTACT SPRAGUE & HENWOOD, Inc.

FOR ALL OF YOUR DIAMOND DRILLING NEEDS

CONTRACT DIAMOND DRILLING ANYWHERE

Many, many firms throughout the United States and the world know the advantages of core drilling; and Sprague & Henwood, with more than 70 years of experience, is the leader in this field. Sprague & Henwood crews have completed thousands of contracts successfully in every conceivable condition. For the best in exploratory core drilling (surface or underground), blast hole drilling, directional drilling, foundation test drilling, grout hole drilling, and pressure grouting—be sure to call Sprague & Henwood. Estimates and suggestions given without charge.

"ORIENTED" DIAMOND CORING BIT

IMPREGNATED CORING BIT

"ORIENTED" DIAMOND "TAPER" TYPE NON-CORING BIT

DOUBLE-TUBE REAMING SHELL

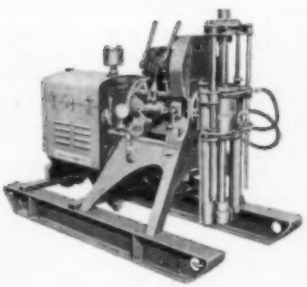
"ORIENTED" DIAMOND BITS

Any bit you buy will work for a while. But if you specify or order Sprague & Henwood "Oriented" Diamond Bits, giving all information on your drilling conditions, you will receive the bit or bits that will do the best job for you. Lower your cost per foot, with a minimum of diamond loss. Write today for complete "Oriented" Diamond Bit Bulletin #320-1.

RESETTING SERVICE

Send in your bits that need resetting, giving full details of results obtained and conditions under which bits were used. They will be returned new—and "Oriented" to give you less diamond loss and lower your cost per foot.

FIELD TESTED DRILLING MACHINES

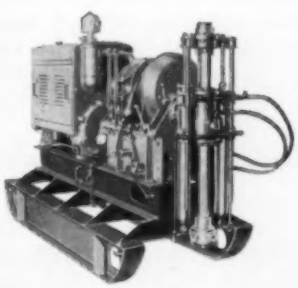


MODEL 40-C CORE DRILL MACHINE

Field Tested means just that . . . with contract work being done under every conceivable condition, Sprague & Henwood drilling machines have to perform right. Different sizes and types to meet various conditions are available. Your conditions should be given in detail, and recommendations will be forwarded to you immediately, without cost.

ACCESSORY EQUIPMENT

In addition to drilling machines, and diamond bits, Sprague & Henwood manufactures and can supply you with a complete line of accessory equipment necessary to make up a drilling outfit, such as drill rods, core barrels, casings, fishing tools, etc. A new and most complete Catalog, No. 400, listing all accessory equipment is available to you. Write today for your free copy. It will be mailed promptly.



MODEL 142 CORE DRILL MACHINE

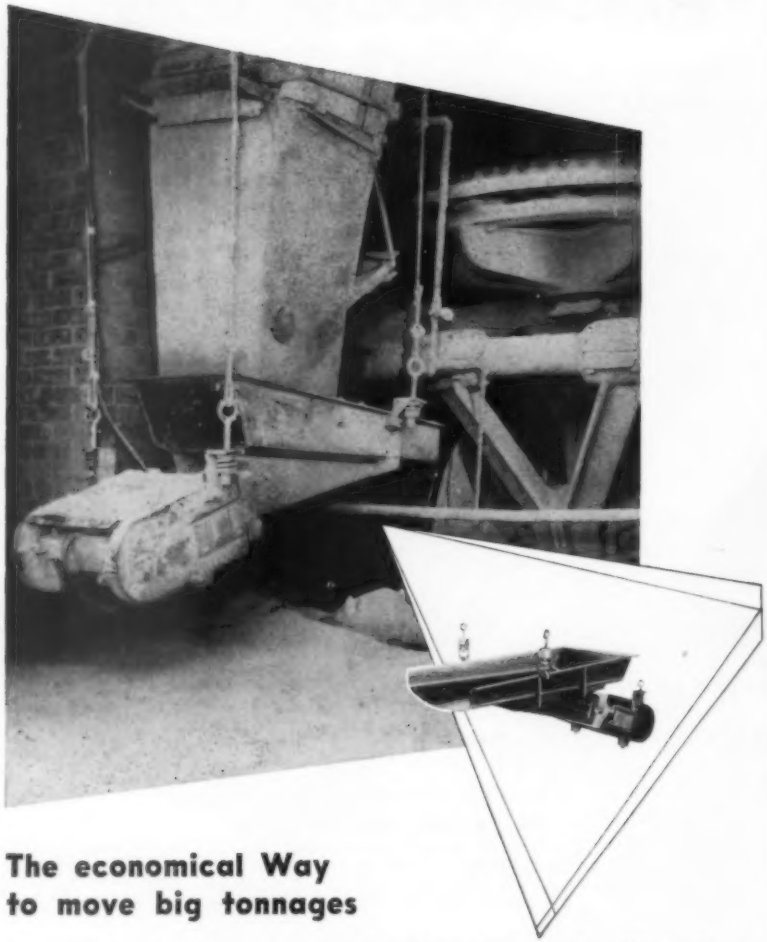
SPRAGUE & HENWOOD, Inc.

SCRANTON 2, PA.

S&H SINCE 1863

Branch offices: New York • Philadelphia • Pittsburgh • Buchans, Newfoundland • Grand Junction, Colorado

SYNTRON
VIBRATORY FEEDERS



The economical Way to move big tonnages

Syntron Vibratory Feeders provide efficient, low cost handling of most bulk materials—run of quarry, crushed rock, hot abrasive material, gravel, etc. at controllable rates of feed from a few pounds to hundreds of tons per hour—materials Rate of Flow adjustable to requirements of processing equipment. Flat pan or tubular trough models.

Other SYNTRON Equipment of proven dependable Quality

WEIGH FEEDER

FEEDER MACHINE

SHAFT SEALS

GRIZZLY SCREENS

Write for complete catalogue—FREE

SYNTRON COMPANY
385 Carson Avenue Homer City, Penna.

Union Bag & Paper Corporation, New York, N. Y., and Camp Manufacturing Company, Inc., Franklin, Va., have jointly announced that their respective directors have approved in principle a plan for a combination of the two paper companies. Under the proposed plan the two corporations would either be merged or the assets of Camp would be acquired by Union in exchange for stock of Union, and the assumption by Union of all Camp liabilities.

Biondi Bit & Drill Steel Co., Waterbury, Conn., have been named distributor for Brunner & Lay Rock Bit of Philadelphia, Inc. This company will service part of the New England territory.

Raymond L. Schwartz of Twin Falls, Idaho, has purchased certain assets of Cummins Diesel Sales Corporation, Boise, Idaho, and has organized a new company known as Cummins Idaho, Inc. Temporarily, the new Cummins Distributorship will operate at 1204 Front Street, Boise. However, plans call for the erection of a new sales and service headquarters at Boise in the near future. Cummins Idaho, Inc., will sell and service Cummins Diesels in 18 central and western Idaho counties as well as Malheur County in Oregon. Mr. Schwartz has, until recently, been the Diamond T dealer at Twin Falls, Idaho.

To provide additional facilities for service with a large factory stock of wire rope, Macwhyte Company, Kenosha, Wis., has opened a new office and warehouse at 75 Oakman Boulevard, Detroit, Mich. This factory stock is supplementary to stocks and services in Macwhyte Company distributors and has been established to give factory service to Macwhyte Company distributors and their customers.

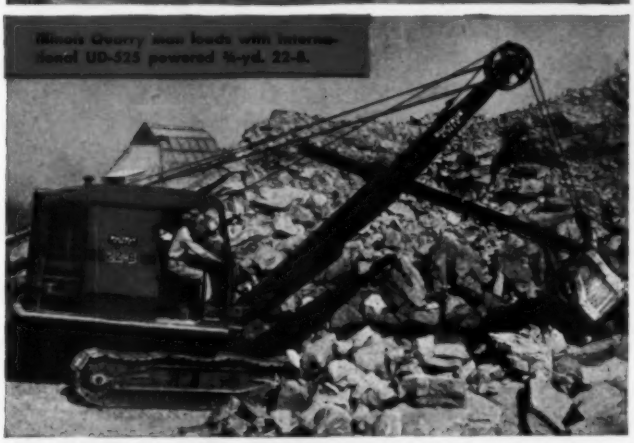
Al Gladding is now representing Flexible Steel Lacing Co., Chicago, Ill., in the northeast states. He takes over the territory formerly covered by Les Coleman who has been transferred to the Chicago sales department where he will assume new and increased responsibilities.

Mr. Gladding for the past three years has operated a distributing organization handling REMA rubber repair materials and has done an outstanding job with this product. Previous to that, he spent six years with a contracting firm, the last two as shop superintendent.

3 more Bucyrus-Erie owners choose
International® Power Units

...custom-engineered to fit pit and quarry power needs

New Hampshire Contractor's shovel is powered by an International UD-350.


Illinois Quarry man loads with International UD-525 powered ¾-yd. 22-B.

Texas coal company strips with 38-B powered by an International UD-1091.

More and more pit and quarry operators, when choosing power for new equipment, or when repowering existing machinery, choose International power units.

One of the big reasons for this swing to International is that these dependable, low-operating-cost units are custom-engineered for pit and quarry power needs. Engines are available in a wide choice of combinations to fit a tremendous range of equipment applications. Performance characteristics can be adapted to match special applications.

But no matter how you specify your International engine, you get famous in-built advantages. Most important of these, to shovel users, is the instantly responsive power. As shovel crowd or digging action demands more torque...it's there, instantly. Here's why. Four-cycle design plus fast-acting governor provide the extra fuel required for no-stall lugging in tough, heavy materials. In addition, you get valve-in-head design, lubrication through rifle-drilled passages, Tocco hardened crankshaft, full-flow diesel oil filters, and many others, including new gear-driven balancers in the 4-cylinder UD-14A and UD-350 International diesel engines for "6-cylinder" smoothness and performance.

So, when your choice of power unit comes up in your next equipment purchase, or when you decide to re-power present equipment, specify International—for long-time satisfaction! Your International Power Unit Distributor or Dealer is ready with complete job analysis, selection and installation service...plus the assurance of prompt parts and service availability.

INTERNATIONAL® CONSTRUCTION EQUIPMENT

International Harvester Company
180 North Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors... Self-Propelled Scrapers and Bottom-Dumps... Tractors and Rubber-Tired Loaders... Off Highway Trucks.. Diesel and Carbureted Engines... Motor Trucks.

CHOOSE FROM 18 HEAVY-DUTY INTERNATIONAL DIESEL AND CARBURETED ENGINES—FROM 17 TO 214 HP

See you at the ROAD SHOW CHICAGO Jan. 28 - Feb. 2, 1957

SETS THE STAGE FOR FRESH AIR

When the curtain goes up on mining operations underground, you're all set when Naylor ventilating lines are part of the scenery.

Naylor pipe provides lightweight lines that can be installed faster and easier. What's more, the exclusive Naylor structure permits the use of lighter gauge material to cut your costs without sacrificing performance.

The Naylor one-piece Wedge-Lock coupling is another dependable "prop" that speeds installation of vital air lines. Lines can be assembled with only one side of the pipe in the open and extended rapidly as the work progresses. It's a combination well worth looking into.

Write for Bulletins No. 507 and No. 514.

NAYLOR PIPE

NAYLOR PIPE COMPANY
1257 East 92nd Street
Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 350 Madison Avenue, New York 17, New York

Duard H. Little has been named assistant manager of Allegheny Ballistics Laboratory, operated by Hercules Powder Company, Wilmington, Del., for the Navy's Bureau of Ordnance, near Cumberland, Md. He has been assistant manager at the Radford Arsenal, Radford, Virginia, another Government Facility operated by Hercules. Mr. Little will be assistant to O. B. Case, manager at Allegheny Ballistics Laboratory.

Succeeding Mr. Little as assistant manager at Radford will be Harold J. Grampp who has been production manager at Radford since 1954.

The Smith Engineering Works, Milwaukee, Wis., manufacturers of *Telsmith* Crushers and other equipment for Mines, Quarries, Gravel Plants and Contractors has announced the appointment of the Manegold Equipment Co., P.O. Box 4405, Joyfield Station, Detroit, Michigan, as executive distributors.

Bucyrus-Erie Co., South Milwaukee, Wisc., have named the following as distributors:

Tractor Equipment Company, Reno, Nevada;

Road Machinery Company, Phoenix, Arizona;

Baton Rouge Equipment Company, Inc., Baton Rouge, La.

Schultz Machinery Company, Bismarck, North Dakota, and

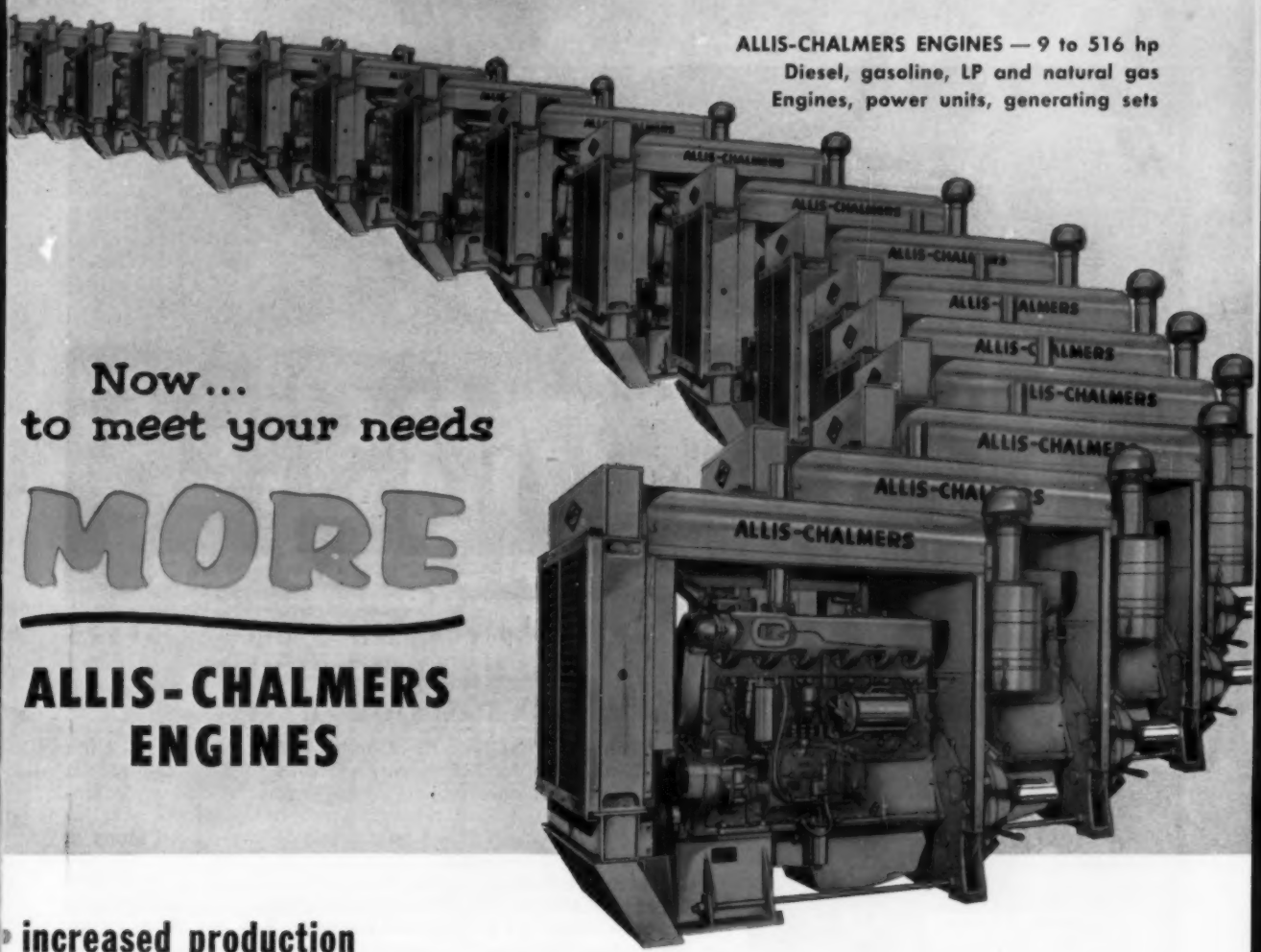
Barnup Equipment Company, Independence, Missouri.

The election of Charles M. Scholz as vice-president of Thermoid Company, Trenton, N. J., has been announced. Since 1955, he had been assistant to the president in a sales coordinating capacity. Before that he had been assistant general manager of Thermoid's industrial rubber division.

St. Regis Paper Company, New York, N. Y., announces the appointment of Clyde C. Stinebiser as branch manager at the company's new multiwall bag plant at Kansas City, Mo. He previously was a superintendent at the Pensacola, Florida, multiwall bag plant of St. Regis.

Henry S. Winnicki, director of engineering and development of Food Machinery and Chemical Corporation's Chemical Division, New York, New York, has announced the appointment of Arthur C. Weygandt as manager of FMC Chemicals central development department, with headquarters in New York.

ALLIS-CHALMERS ENGINES — 9 to 516 hp
Diesel, gasoline, LP and natural gas
Engines, power units, generating sets



Now... to meet your needs MORE

ALLIS-CHALMERS ENGINES

- **increased production**
- **improved standards**
- **expanded service**
- **greater parts availability**
- **more parts interchangeability**

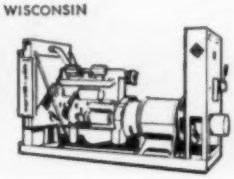
The production of Allis-Chalmers engines goes up, up, up to meet your needs. The 1956 production is expected to reach an all-time high — and 1955 output was many percent greater than 1954's. A multi-million-dollar expansion of facilities will further boost production.

But there are not only *more* engines to meet your needs, there are *better* engines — as Allis-Chalmers research and development continues to pioneer improvements, and as production and inspection standards are set even higher.

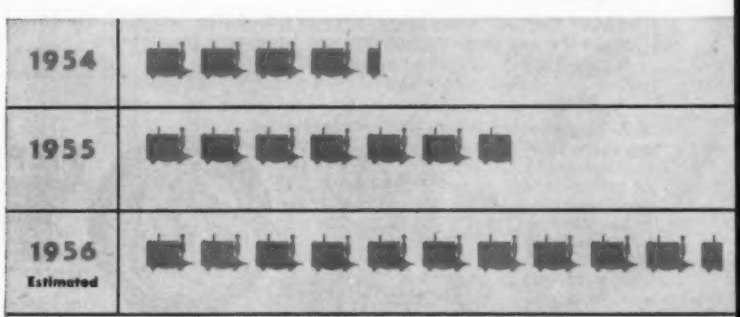
Along with this comes an expansion of customer service and greater parts availability, too, as sources of parts and service are moved closer to you.

More and more, it's Allis-Chalmers engines and service to meet your needs.

ALLIS-CHALMERS, BUDA DIVISION, MILWAUKEE 1, WISCONSIN



A complete line of improved engine generator sets from 5 to 300 kw, for emergency and continuous duty, for marine, cooling tower and industrial use.



The 1956 production of Allis-Chalmers engines will reach an all-time high, with output many percent higher than in previous years.

ALLIS-CHALMERS

BE-3

King Size STONE STACKER

Here's a single wing stacker which moves along 800-feet of track to store various sizes of limestone in 80-foot high piles. It's one of four including a double wing unit which can discharge to either side of a long belt conveyor.

S-A HUGE TRAVELING BELT TRIPPERS PILE UP PAUL BUNYAN SIZE TONNAGES!

Approximately 70,000,000 tons in twenty five years . . . That's the Inland Lime and Stone Company story as told at their recent quarter century celebration. A big plant when it opened in November of 1930, the Port Inland operation has grown steadily through the years until it is now capable of turning out stone at a 5 million ton a year rate.

Completely equipped by Stephens-Adamson, the Inland plant is capable of storing at a 750-ton per hour rate and loading out to ships or railroad cars at 3000-tons per hour. S-A live roll grizzlies, screens, manganese steel feeders and belt conveyors are tied together in a centrally operated system which even today meets every demand of the popular cry for "automation".

S-A bulk material handling systems like this one are doing their stuff every day all over the world. From the simplest to the largest, most complex conveying and processing problems, none are too tough for S-A designing and manufacturing skills . . . Let us prove it.

General view at Inland plant, showing dockside facilities. Height of stone piles minimizes area necessary for storage.

Double wing stacker delivers to either side. Inclined belt is supported by a trailer.

S-A engineering skill is solving hundreds of materials handling problems every year all over the world. This same talent can save you time and cost too.

"IT PAYS TO CONVEY THE S-A WAY"

STEPHENS-ADAMSON MFG. CO.

20 Ridgeway Ave., Aurora, Ill.—Los Angeles, Calif.—Belleville, Ontario.

ENGINEERING DIVISION
Designers and manufacturers of all types of bulk materials conveying systems.

STANDARD PRODUCTS DIVISION
A complete line of conveyor accessories—centrifugal loaders—car pullers—bin level controls, etc.

SEALMASTER DIVISION
A full line of industrial ball bearing units available in both standard and special housings.

Amazing records of improved hot zone service

WITH KAISER PERICLASE CHROME BRICK

Four companies report:

1 **"2194 barrels per day for 505 days"** over a six-inch lining of Kaiser Periclase Chrome Brick recently established a new 15 year record for a well-known cement producer. In this 112′ x 11′ kiln, the best previous performance with basic brick was 340 days. A second kiln of the same design, using Kaiser Brick, is still in operation after 700 days. During that period the only repair was a 5′ patch, which, according to the customer, probably wasn't necessary.

2 **"Outlasts other brick 4 to 1!"** Leading cement producer cites average life with Kaiser Kiln Liners as 11 months for 42′ hot zone and 14 to 15 months for most of the six-inch lining. Records show that 70% alumina brick would have necessitated at least 4 linings during this time. The 400′ x 11′ kiln produces 3,250 barrels per day.

3 **"We get exceptional service** with Kaiser Kiln Liners!" Another large cement company reports that one kiln operated 433 days with six-inch lining of Kaiser Periclase Chrome Brick compared to recent runs averaging 295 days with other basic brick. Kiln size: 150′ x 10′ . . . Production: 2,200 barrels per day.

4 **"Longest service ever!"** . . . 170′ x 10′ kiln, with a six-inch lining of Kaiser Periclase Chrome Brick came down after a run of 18 months, 8 days . . . topping the previous record by 2 months. Previous alumina linings lasted only 3 to 4 months.

The examples above are only a few of many in our files from all over the country which prove that you can get dramatically improved hot zone service with Kaiser Periclase Chrome Brick.

Contact your Kaiser Chemicals sales engineer *now*. Let him explain why this superior brick can give you increased clinker production at lower cost... with far fewer shutdowns!

For more information call our nearest Sales Office: Kaiser Chemicals Division, 1924 Broadway, OAKLAND 12, Calif. . . . 3 Gateway Center, PITTSBURGH 22, Pa. . . . 518 Calumet Bldg., 5231 Hohman Avenue, HAMMOND, Indiana.

To obtain free copies of Kaiser Chemicals product literature write Kaiser Aluminum & Chemical Sales Inc., 1924 Broadway, OAKLAND 12, California, Dept. C62x11.

Kaiser Chemicals

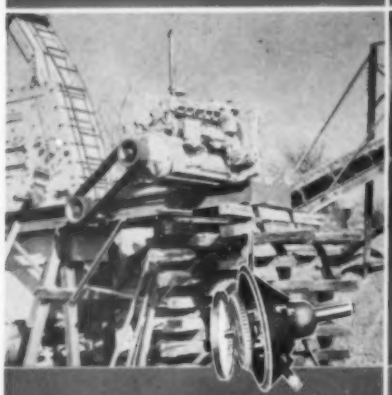
Pioneers in Modern Basic Refractories

Refractory Brick and Ramming Materials • Castables & Mortars • Magnesite • Periclase • Deadburned Dolomite

CRAWLER TORQUE CONVERTER

FLUID POWER TAKE-OFF

TRUCK-TYPE TORQUE CONVERTER



FRICTION POWER TAKE-OFF

FLUID COUPLING

CL FRICTION CLUTCH

At nearly every pit and quarry you find TWIN DISC

At nearly every pit and quarry, you're likely to find Twin Disc Friction or Fluid Drives dependably applying power to driven equipment.

In removing overburden, you'll find the biggest crawler tractors driving through Twin Disc Torque Converters . . . power shovels, equipped with either Twin Disc Converters or Fluid Power Take-Offs . . . and trucks incorporating Twin Disc Truck-Type Torque Converters.

In the production of aggregate, you'll find stationary power units equipped with rugged Twin Disc Friction Power Take-Offs . . . conveyor systems, receiving a *shock-cushioning* flow of power through Twin Disc Fluid Couplings . . . and drills, equipped with Twin Disc Model CL or EH Friction Clutches.

Today, Twin Disc is the world's largest exclusive manufacturer of a complete line of friction and fluid drives—for correctly linking horsepower to industrial powered equipment. Since 1918, Twin Disc *specialists* have designed and built friction and fluid drives *for that one purpose.*

If *you* have a power transmission headache—consult the Twin Disc Clutch Company, Racine, Wis., Hydraulic Division, Rockford, Ill.

TWIN DISC

TWIN DISC

Friction Clutches and Fluid Drives

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division) Rockford, Illinois

with Gulf Lubricants and Fuels

on the job at Macon Quarries, Macon, Georgia

Helping quarry operators keep equipment working smoothly and efficiently is an important part of Gulf's business—made possible by a complete line of high quality lubricants and fuels, plus practical petroleum engineering service.

Gulf lubricants provide an extra margin of protection—prevent excessive wear and keep maintenance costs down. Gulf fuels burn evenly and completely—leave fewer harmful engine deposits and contribute to top engine performance.

And Gulf Sales Engineers are always available to assist you on any problem involving a petroleum product. Try this crack combination of quality products, helpful engineering counsel, and prompt delivery service in your operation.

Consult the telephone directory for the number of your local Gulf office, or write on your company letterhead to the address below.

Gulf Oil Corporation · Gulf Refining Company
1822 Gulf Building, Pittsburgh 30, Pa.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

MURPHY DIESEL POWER

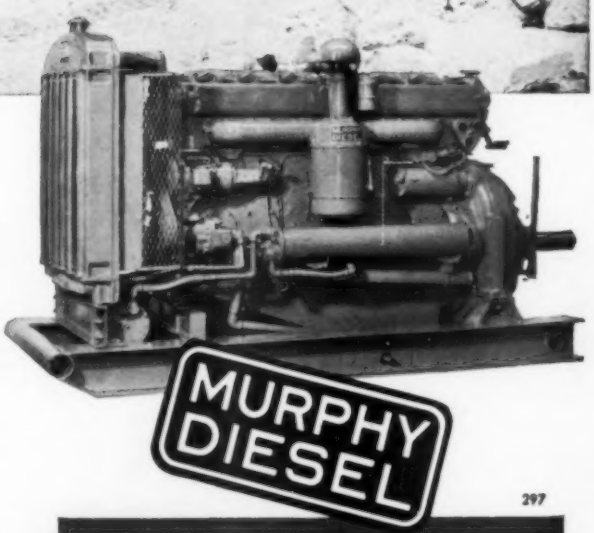
all the way on this job...

. . . turns out over 100 tons of limestone and flint rock per hour

● From this Kansas pit, W. O. Homer of Junction City, Kansas, is turning out 100 tons of limestone and flint per hour, with flint accounting for about 20% of the total. Mr. Homer is doing this job with a Murphy Diesel powered Northwest shovel and a Murphy Diesel powered Universal portable crushing plant. So it's Murphy Diesel all the way on this job.

If you're looking for dependable output at maximum operating economy, profit by the experience of pit and quarry operators everywhere, and put Murphy Diesel power to work for you. It's your best bet for getting the most rock per gallon of fuel and you'll particularly like the trouble-free service and freedom from costly downtime.

Talk over your requirements with your Murphy Diesel Dealer and ask him to show you what Murphy Diesel power can do for you.



297

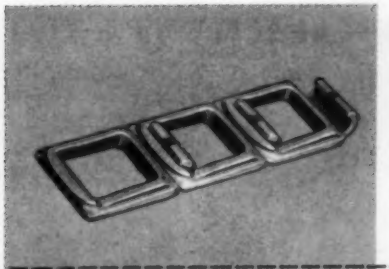
Heavy duty power

for rock crushing

Murphy Diesel Engines and Power Units are available in sizes from 96 to 264 H.P. Engine speeds are 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64—165 K.W.

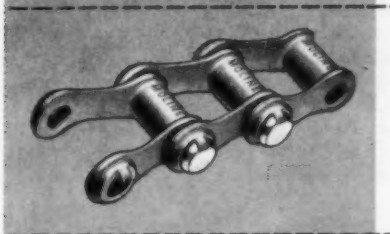
MURPHY DIESEL COMPANY
5307 W. Burnham Street
Milwaukee 14, Wisconsin
Sales, parts, service throughout the nation

FOR ALL TYPES OF CONVEYING ELEVATING AND HANDLING



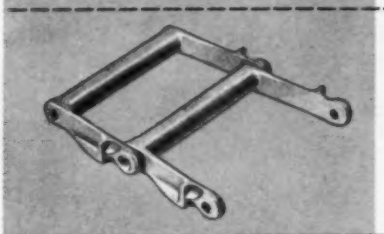
DETACHABLE CHAINS

for drives and elevators and conveyors, combine the advantages of easy assembly, utility and low cost.



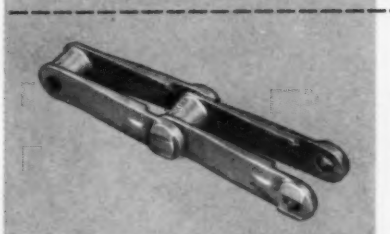
PINTLE CHAINS

for drives and heavy duty conveyors and elevators, are light in weight and moderately priced.



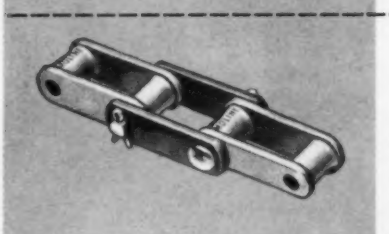
REFUSE CHAINS

for conveying wood refuse, ashes and other waste materials, are designed to push materials through troughs.



LONG PITCH PINTLE CHAINS

for conveyor and elevator service, provide great strength with minimum weight at low cost.



COMBINATION CHAINS

for extra heavy duty service, are used in conveying and elevating highly abrasive materials.

Moline Chains for conveyors, elevators and drives are the finest that modern manufacturing methods can devise. They have set the standards for many industrial purposes.

Moline Chains are available in both Moline Malleable or Moline Promal Iron.

Distributors and dealers everywhere. Write for information.

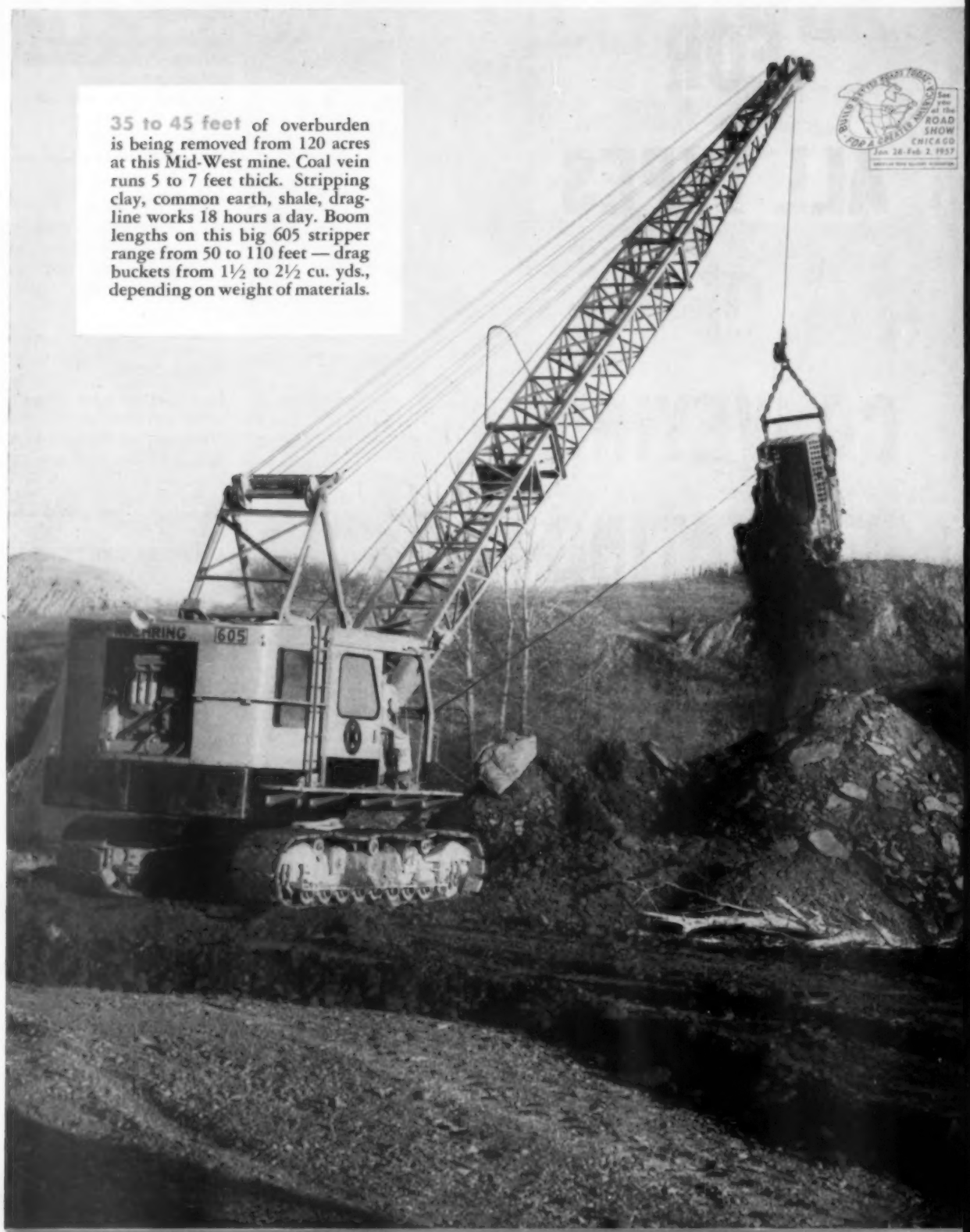
Moline CONVEYOR Chains

MOLINE MALLEABLE IRON CO.
ST. CHARLES, ILLINOIS

LEADERS FOR 60 YEARS

Licensed Manufacturers of Promal Chains

KOEHRING WORK CAPACITY *in action . . .*



35 to 45 feet of overburden is being removed from 120 acres at this Mid-West mine. Coal vein runs 5 to 7 feet thick. Stripping clay, common earth, shale, dragline works 18 hours a day. Boom lengths on this big 605 stripper range from 50 to 110 feet — drag buckets from 1½ to 2½ cu. yds., depending on weight of materials.

BUILDING FOR A GREATER AMERICA
See you at the ROAD SHOW CHICAGO Jan. 28-Feb. 2, 1957

KOEHRING COMPANY Milwaukee 16, Wis.

Subsidiaries: JOHNSON PARSONS • KWIK-MIX

Meet the 405 — new heavy-duty leader in the 1-yard class. Operators like its ease of control, big power clutch, automatic traction brakes, and simple 2-shaft design of upper machinery. *You'll* like its big work capacity with all attachments: 1-yard shovel or hoe, 1 to 1½-yard clam or dragline, 20-ton crane.

Pan-handler — In an Eastern quarry, slabs of sandstone are palletized on pans for quick pick-up, and loaded on trucks. Pans weigh an average of 3½ tons — an easy lift for the Koehring 205 truck crane. Constantly moving to various piles around the quarry, it easily loads 24 pans an hour, according to quarry foreman. With this mobile 205 crane they are equipped to handle loads up to 15 tons.

Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
205 CRAWLER	½-Yd.	20,000 lbs.	at 10-foot radius
205 ON RUBBER	½-Yd.	30,000 lbs. 13,700 lbs.	at 12-foot radius at 20-foot radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-foot radius
305 ON RUBBER	¾-Yd.	50,000 lbs. 15,800 lbs.	at 10-foot radius at 30-foot radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-foot radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-foot radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 13-foot radius

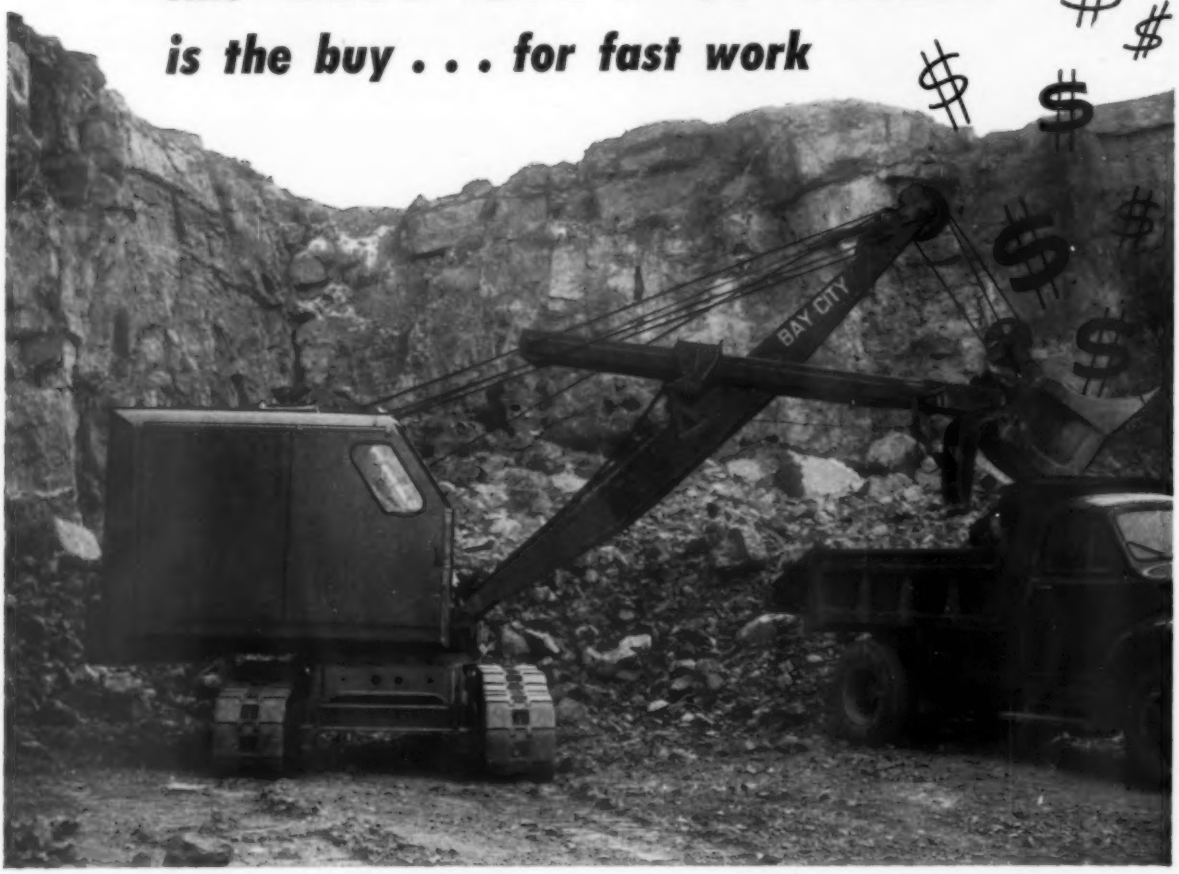
At rail siding, 305 clamshell crane speeds transfer of material from gondola cars to trucks. Its fast swing and wide work radius pay off on any material-handling. This heavy-duty 305 is another in a modern, new series of Koehring extra-capacity excavators and cranes. Look them over. They're all listed in accompanying chart.

X894

KOEHRING HEAVY DUTY

Want more information? Call Koehring distributor today.

how to dig up profits . . .
this BAY CITY ¾ YARD
is the buy . . . for fast work



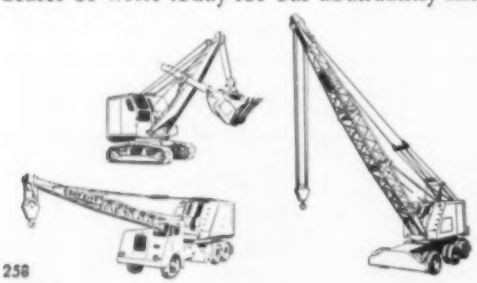
Want performance in a shovel? Then get a BAY CITY ¾ YARD. Its snappy swing, quick, responsive controls, fine balance and powerful engine provide a fast digging cycle. That means dollars to you in the field.

And the rugged, heavy duty construction of this BAY CITY machine means less down time for repairs and lower all-round maintenance costs. More dollar savings to you in the shop.

Fully convertible and equally efficient as a shovel, hoe, dragline or clamshell. Get the complete facts from your nearest BAY CITY dealer or write today for our abundantly illustrated catalog.

Quick Facts About The BAY CITY ¾ YARD

Fully Convertible
Long, Wide Crawlers
Alloy Cast Bases
Tandem Drums
Power Booster Clutches
High Line Speeds
Wide Vision Cab
Worm Boom Hoist



258

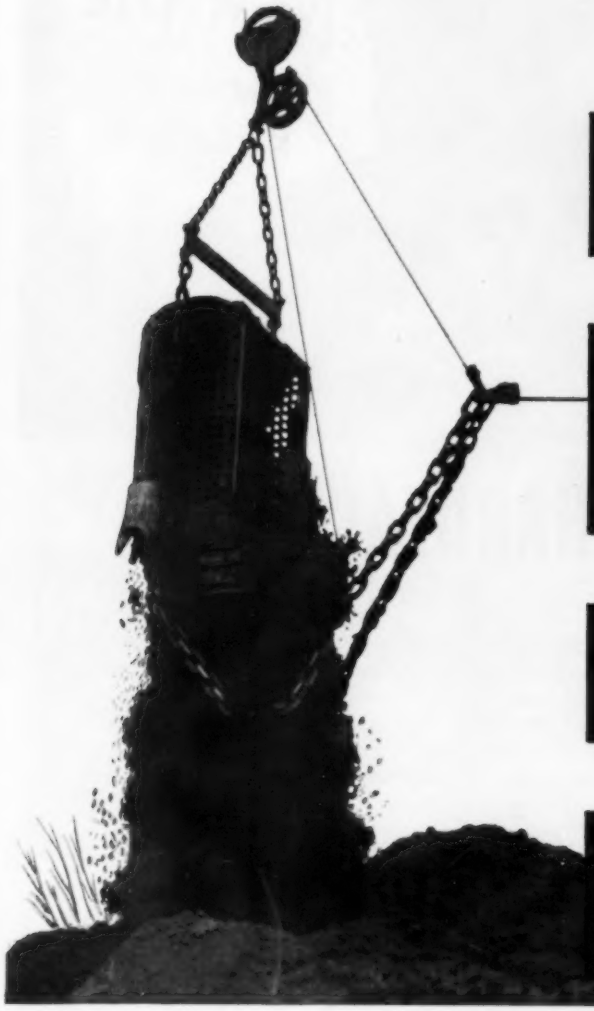
BAY CITY SHOVELS INC. • BAY CITY, MICHIGAN

BAY CITY

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

when buying buckets...

consider these *Hendrix* features



LIGHTER BUCKET WEIGHT... providing greater capacity without sacrifice of strength or durability.

ALL-WELDED CONSTRUCTION... including arch of box-section design and one-piece hitch plate and hoist trunnion casting for structural strength and distribution of drag pull.

14% MANGANESE STEEL... chains, all other fittings, reversible tooth points and armor.

PERFECT PERFORMANCE... easier handling... faster loading... cleaner, smoother dumping.

A TYPE FOR EVERY DIGGING PURPOSE

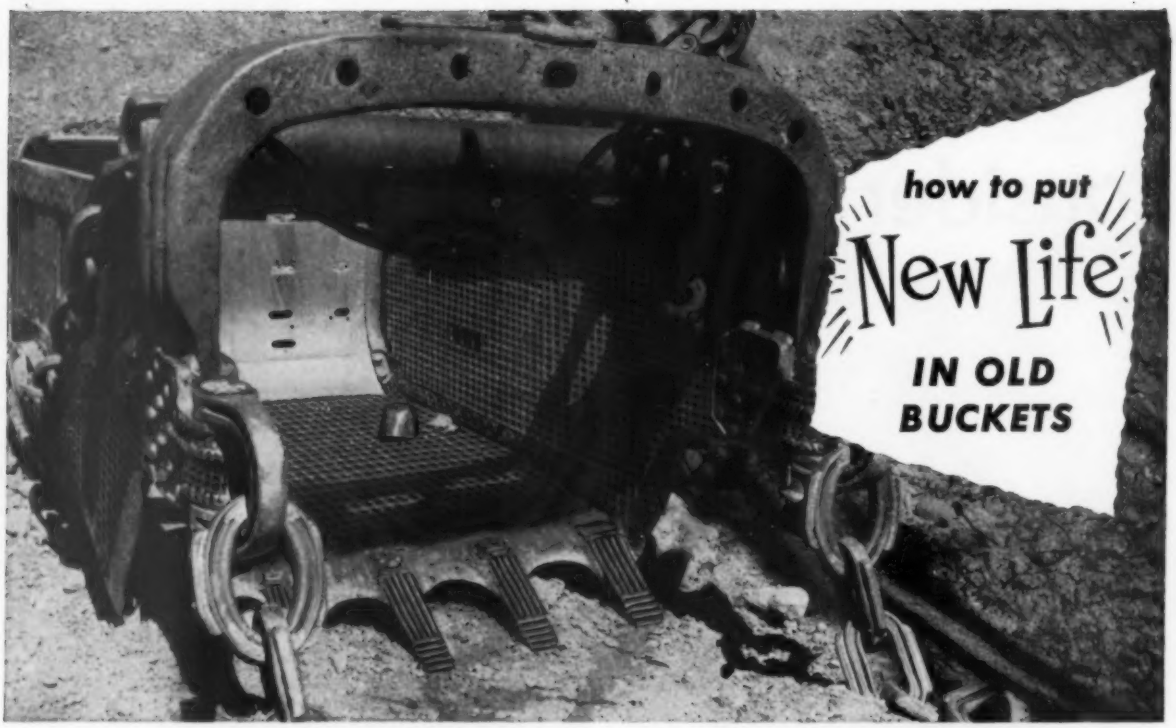
¼ to 40 Cubic Yards

Hendrix *Dragline Buckets*

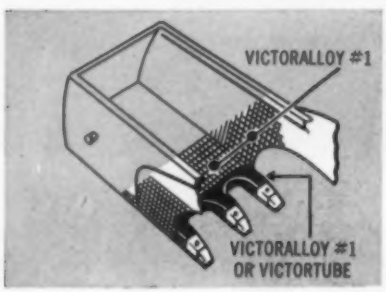
All Hendrix Buckets available without perforations

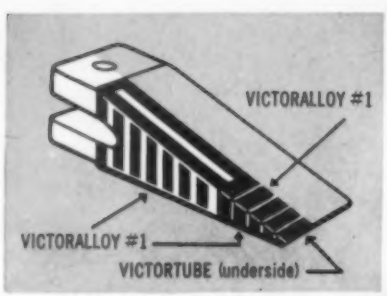
HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA



USE VICTOR HARDFACING





Buckets . . . Apply VICTORALLOY #1 to top and bottom of bucket lips in overlapping beads. Protect other parts or areas showing wear with stringer beads of VICTORALLOY #1. Use 3/16″ coated VICTORALLOY #1 at 170 to 190 amperes, a.c. or d.c., or ¼″ at 200 to 225 amperes. If wear is unusually severe, substitute VICTORITE on bucket lips; use 3/16″ coated at 120 to 150 amperes, a.c. or reverse-polarity d.c.

Teeth . . . Apply VICTORTUBE to underside from point upward about 2″, and VICTORALLOY #1 to upper side of tooth same distance. Use stringer beads of VICTORALLOY #1 on balance of upper and lower surfaces, and on edges. Use 3/16″ coated VICTORTUBE at 130 to 160 amperes, a.c. or reverse-polarity d.c., and 3/16″ coated VICTORALLOY at 170 to 190 amperes, a.c. or d.c.

Why guess? . . . Select the right alloy from VICTOR's complete hardfacing line, made for both gas and manual or automatic arc application. New VICTOR illustrated hardfacing manual tells which alloys to use, how to apply. Ask your VICTOR dealer or write us today for your free copy.

Profitable dealerships open; inquire now!

VICTOR for hardfacing

VICTOR EQUIPMENT COMPANY
ALLOY ROD & METAL DIVISION
Mfrs. of welding & cutting equipment; hardfacing rods; blasting nozzles.

19-H

11440 So. Alameda St. • Los Angeles 59

(Illustration from Agricola's De Re Metallica (1621)

All ore processing was difficult 400 years ago

There was a time when the grinding in an ore preparation plant consisted of a man with a hammer—like the one shown here, equipped with heavy leggings and gloves to protect himself against flying ore chips.

Today's ore processing plant is a far cry from this. It utilizes efficient grinding mills that turn out many tons of processed ore every day—mills which so often use CF&I Grinding Balls and Rods. CF&I Grinding Balls and Rods are always made from special analysis steel that has the ideal balance between toughness and hardness to assure optimum grinding ability and maximum wearability.

THE COLORADO FUEL AND IRON CORPORATION

Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver • El Paso • Ft. Worth • Houston • Lincoln (Neb)
Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Antonio
San Francisco • Seattle • Spokane • Wichita

CF&I

Gar Wood -St. Paul- -first choice for dependability!

Contractor chooses Gar Wood-St. Paul dump bodies and hoists for 50-truck fleet on Patapsco Tunnel job

To speed work on the approach for Baltimore's new Patapsco Tunnel, Eastern Contractors, Inc. works a 50-truck fleet two grueling 10-hour shifts per day. For day-in, day-out dependability, Eastern's superintendent Mike Marcellino specified Gar Wood-St. Paul equipment on all units. Each rig hauls and dumps 30 loads of fill per shift, takes the shock of shovel loading 20 hours a day.

On big jobs everywhere, Gar Wood-St. Paul equipment is delivering the payloads contractors need, *when* they need them and at a lower net cost per payload hour. Design makes the difference! Gar Wood-St. Paul dump bodies are stress-tested to put strength where it's needed, eliminating excess weight. Strong-Arm hoists are designed for greater stability and faster, safer dumping regardless of grade or load distribution.

Get all the facts about the most dependable, most advanced line of truck equipment on the market. Call your Gar Wood-St. Paul distributor, or write to: Customer Service Dept., Gar Wood Industries, Inc., Wayne, Mich.

World's Easiest Hoist to Maintain

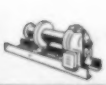
- Can be completely serviced with ordinary truck tools!
- Exclusive tie-rod cylinder design speeds up inspection, maintenance or repair of cylinder!
- Precision-machined hydraulic pump easily serviced in field by average truck mechanic!

GAR WOOD INDUSTRIES, INC.

Wayne, Michigan • Richmond, California

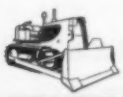
Plants in Wayne and Ypsilanti, Mich.; Findlay Ohio; Mattoon, Ill.; Richmond, Calif.

Gar Wood Truck Cranes


Gar Wood Winches

Gar Wood-Buckeye Ditchers

Gar Wood-Buckeye Finegraders


Gar Wood Tractor Equipment

Gar Wood Excavators

How to beat a fleet of limited-duty rigs ...WITH ONE International® Drott 4-IN-1

Beat a power shovel wherever exclusive Drott *triple-power, pry-action break-out* is decisive—and where quick International crawler mobility can outspeed and "out-reach" a boom. Break-out force of the three Four-In-One models as Skid-Shovels ranges from 12,800 to 55,000 lbs!

Gain a 30-inch (or greater) dumping height advantage over ordinary roll-forward bucket dumping—by using the bottom-dump feature of the Four-In-One as a clamshell. And loading with the clamshell action, get a super-fast bucket-fill on stockpiled materials, even in cramped quarters.

Get versatile carry-type scraper action with the Four-In-One in Bullclam position. Using positive clam lip control, spread materials, strip, and grade with amazing accuracy. And as a Bullclam, the Four-In-One *heap-loads* itself with speedy, earth-boiling action!

Get big dozing capacity with finger-tip ease with your Four-In-One in bulldozer position. Regulate dozing depth by hydraulic "radius control" of blade pitch. Note the frost-breaking, earth-moving action. Shown here is new 2¼-yard Four-In-One for the International TD-14.

Prove Four-In-One versatility unlimited with the 1-yard TD-6, the 1½-yard TD-9, or the new 2¼-yard TD-14 model. Test *exclusive* pry-over-shoe break-out action, and *exclusive* shock-swallowing Hydro-Spring. Ask your International Drott distributor for a Four-In-One demonstration.

International Harvester Company, Chicago 1, Illinois

INTERNATIONAL® DROTT

B&W

wants to give you

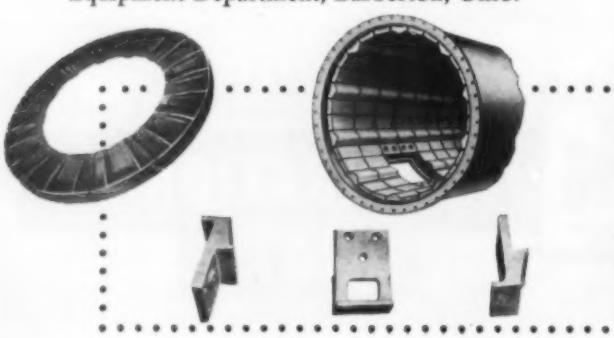
this new 40-PAGE CATALOG on alloy castings

Containing up-to-the-minute information on Alloy Castings, it covers both heat- and wear-resistant types of castings in applicable industries:

Industrial Furnace Applications, Cement, Petroleum, Power, and Steel Processing.

Fully detailed, it covers grades, chemical compositions, physical properties at room and elevated temperatures.

It's all yours. Just write, call or wire for Bulletin S-17 to The Babcock & Wilcox Company, Process Equipment Department, Barberton, Ohio.



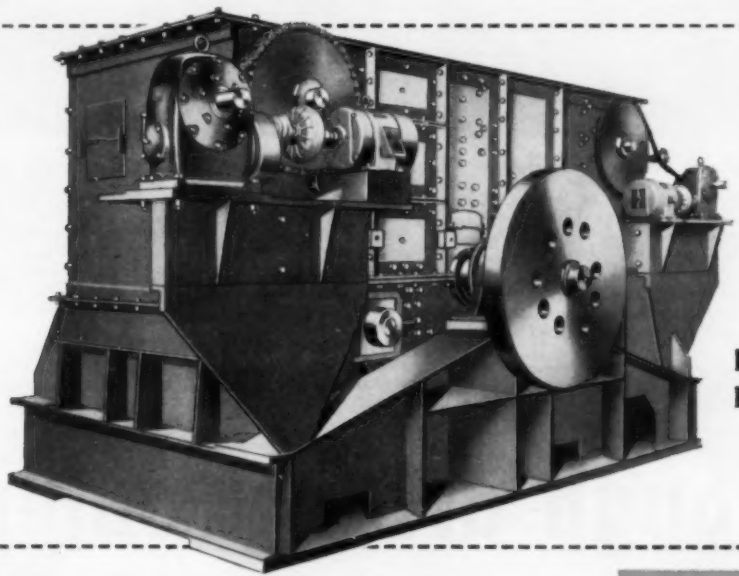
BABCOCK & WILCOX

BOILER DIVISION

S-460

WET, STICKY MATERIAL CAN'T CLOG A

Bulldog Hammermill



NC
Non-clog

Traveling Breaker Plate keeps production going, hour after hour

Regardless of moisture, a BULLDOG NON-CLOG HAMMERMILL keeps your crushing operation going without clogging or jamming. Traveling breaker plate eliminates build up of material in breaking chamber . . . moving cleaning bar keeps discharge free at all times. You get steady hour after hour tonnage with no costly downtime.

For top performance in cement mill, mine and quarry plant operations choose a BULLDOG. Get a mill that has been designed, engineered and produced by hammermill specialists who have been doing the job better for 35 years. Every BULLDOG HAMMERMILL is "Engineered to your job" for greater output with less horsepower, longer hammer life, minimum maintenance. If you want to make better use of hammermills in your operations . . . consult our engineers. Tell us your crushing problems now.

The Bulldog Hammermill Line

For primary and secondary crushing

- World's Largest Bulldog Impactors
- Non-Clog Moving Breaker Plate Hammermills for Wet Materials
- Stationary Breaker Plate Hammermills for Dry Materials.

For secondary crushing and Fine Reduction

- Center Feed Hammermills

Capacities 1 to 1000 tons per hour

Recommended for

Limestone • Clay • Shale • Bauxite
Gypsum • Coal • Wood Fibre • Coke
Carbons • Iron Ore • Lime • Fullers
Earth • Phosphate • Mud Balls • Bones
Tankage or any reducible material

Subsidiary of
PETTIBONE
Mulliken Corp.

AUXILIARY EQUIPMENT:
FEEDERS • CONVEYERS • SCREENS • BINS

HAMMERMILLS, INC.

619 C Avenue, N.W., Cedar Rapids, Iowa

MANUFACTURED BY UNIVERSAL ENGINEERING CORPORATION

A few of the industries using this product:
Lone Star Cement Corp.,
Penn-Dixie Cement Co.,
Alpha Portland Cement Co.,
Universal Atlas Cement Co.,
Dewey Portland Cement Co.,
Missouri Portland Cement Co.,
Monarch Cement Co.,
Gypsum Portland Cement Co.

Intense heat no problem for Super Belts

This hydraulic press at Hackney Iron and Steel Co., Enid, Oklahoma, shapes red hot steel plate into tank heads.

The flat leather belt formerly used on this type of press, would stretch, slip, and come off. Tightening the belts only overloaded the bearings. For this press, a Gates Super Vulco Rope drive was chosen because it withstands the near-by intense heat, and its extra horsepower capacity permits lighter weight sheaves; thereby reducing load on bearings.

Claude King, maintenance superintendent, reports: "This Gates V-belt drive has operated 8 hours a day for 5 years without lost time due to maintenance."

Super Belts on vibrator last 7 times longer

James Gann, general superintendent of John B. LaGarde, Inc., Anniston, Alabama, reports:

"Practically every condition exists to shorten V-belt life on the vibrator drive of this concrete block machine. The machine starts and stops 4 times a minute. Intense vibration must be absorbed by the V-belts to protect motor and bearings. Sand and concrete, oil and grease all get into the drive.

"With Gates Super Vulco Ropes, we get about 7 times the average life we received from any other make, It is hard to believe that belts can take this punishment, but Gates Super Vulco Ropes do it."

Solve tough drive problems with this super tough V-belt

If present V-belts are wearing out too fast . . . if heavy shock loads . . . oil and heat . . . or other conditions are causing too frequent replacement . . . here's the answer:

Gates Super Vulco Rope—the oil and heat resistant V-belt with 40% more horsepower capacity. Easily handles heavy shock loads.

That means longer V-belt life and *cost savings two ways*—savings on belt replacements and savings on maintenance down-time.

Let a Gates V-Belt specialist help you solve *any* tough drive problem. He'll make recommendations without obligation. Gates offices and distributor stocks are listed in the phone book yellow pages in all major industrial centers. The Gates Rubber Co., Denver, Colorado—*World's Largest Makers of V-Belts.*

The Mark of Gates *Specialized Research*

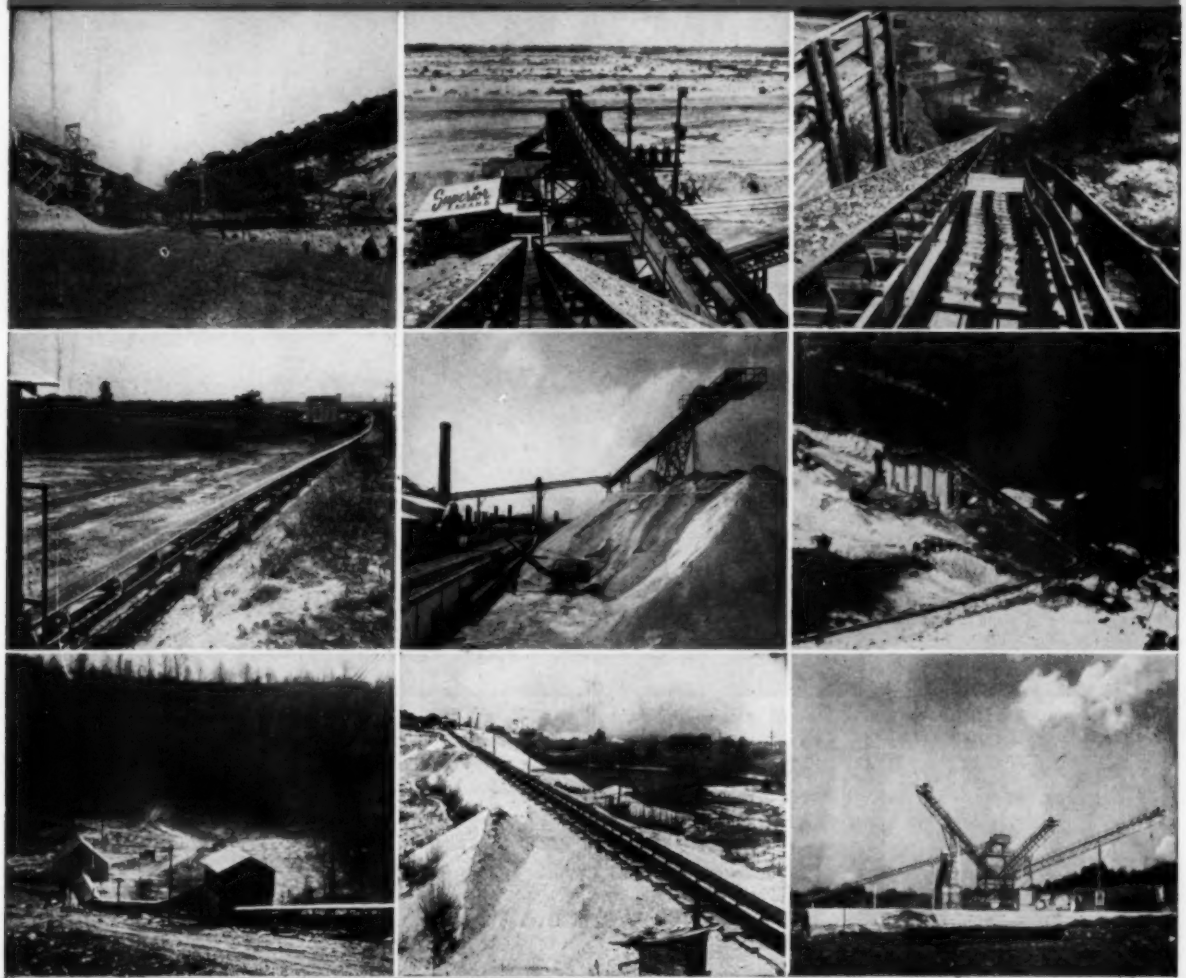
TPA 104

Gates SUPER VULCO ROPE Drives

STONE HANDLING!

These are tough jobs—requiring sturdy equipment for long life and uninterrupted service.

That's why these operators specified *Continental*



OTHER PRODUCTS: Elevators, Feeders, Screw Conveyors, Pulleys, Trippers, Buckets, Sprockets, Takeups and Bearings.

For detailed information on these idlers, write for Bulletin PO 116 (CG-6282)

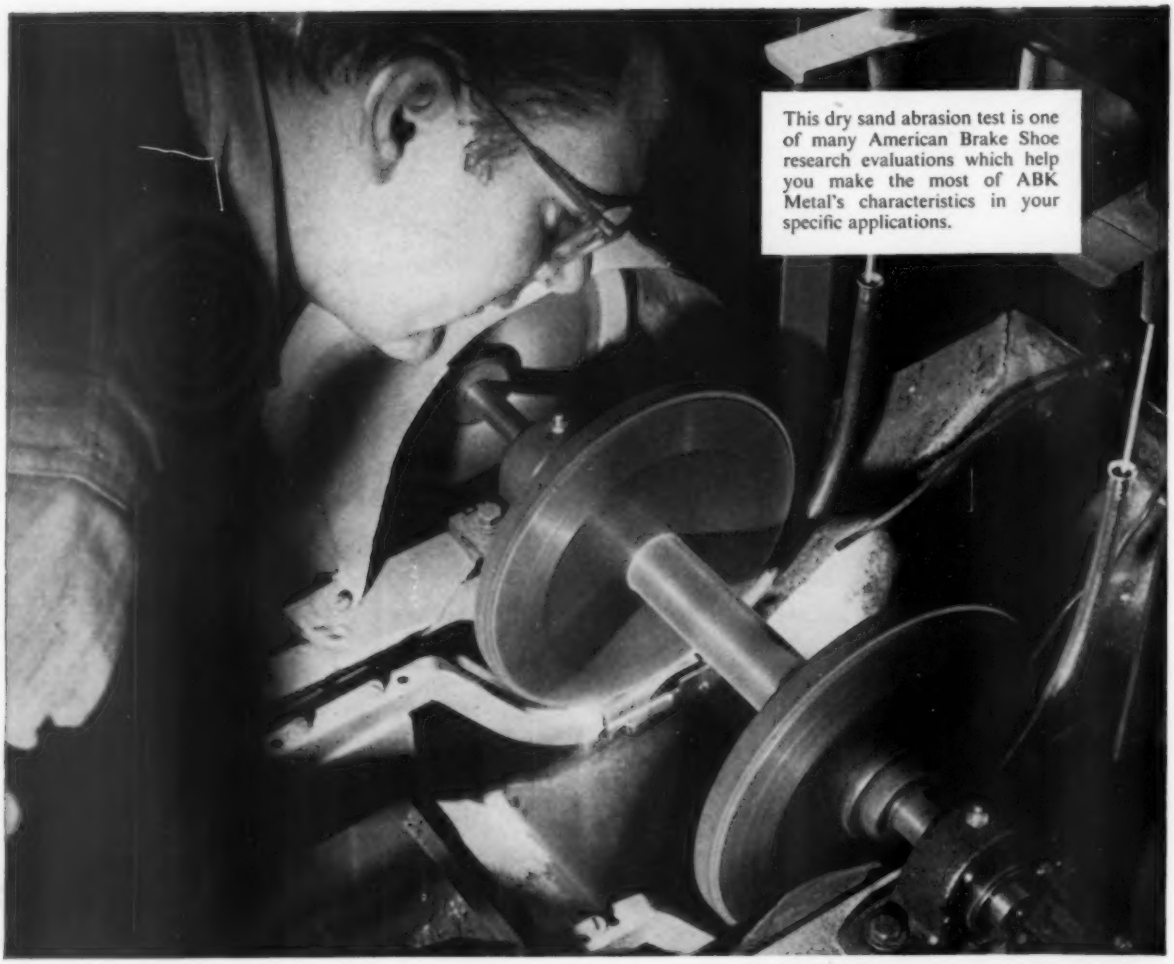
INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • KNOXVILLE • MEMPHIS CGC MANUFACTURERS

NEW YORK 17, NEW YORK



This dry sand abrasion test is one of many American Brake Shoe research evaluations which help you make the most of ABK Metal's characteristics in your specific applications.

ABK® METAL

research helps your fight against abrasion

In severe abrasive service—such as mill liners—three to four times the usual life can be expected with ABK Metal! Its extreme hardness (500 to 700 Brinell) and very high resistance to abrasion make it "good as new" when ordinary materials are worn out.

Because it lasts so much longer, ABK Metal costs far less per ton of material processed. ABK Metal liners reduce down-time and prevent costly losses of production. ABK Metal also slashes the labor expense of frequent liner replacement.

ABK Metal—a controlled structure nickel-chrome iron—is produced *only* by American Brake Shoe.

A-1826

AMERICAN Brake Shoe COMPANY

BRAKE SHOE & CASTINGS DIVISION
230 PARK AVENUE · NEW YORK 17, N. Y.
CHICAGO · SAN FRANCISCO

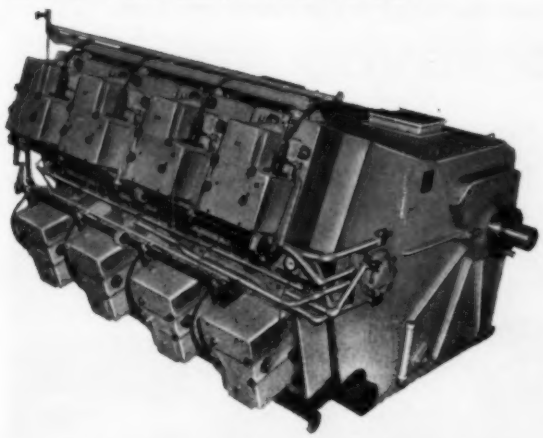
FOR HIGH PRODUCTION AND LOWEST OPERATING COSTS—

NOTHING equals the PAGE 700 SERIES

SINGLE DECK WALKING DRAGLINE

3 models
5 to 15 cubic
yard capacities

Powered by the
DRAGLINE-PROVED PAGE HORIZONTAL V-TYPE DIESEL



The Page Engines powering 700 Series Draglines are designed specifically for dragline work . . . to work longer, at lower cost, with less downtime and maintenance than any other engine. Big bearings, big pistons, a short, stiff crankshaft and slow (450 RPM) speed are only part of the story of why many Page Diesels are still producing maximum horsepower after 20 years of operation. Bulletin WDSD-155 has full details.

Page 700 Series Draglines are rugged, compact, workhorse machines. They are designed and built with the fastest practical hoist and swing speed to reduce cycle time and increase yardage.

The Page 700 Series Dragline is proof that a fast, efficient, medium-sized machine will *consistently* outperform larger, but slower machines in virtually every kind of digging.

In addition, initial investment for a Page 700 Series Walking Dragline is considerably smaller, and operating and maintenance costs are lower. *Want more details? Write for Bulletin WDSD-155 today. There's no obligation.*

PAGE ENGINEERING COMPANY
CLEARING P. O.—CHICAGO 38

Page

Automatic Dragline Buckets
Walking Draglines

W-2001

If it's a PAGE... It DIGS

NEW SAUERMAN SLACKLINE CABLEWAY INCREASES PRODUCTION OVER 25%

Bucket breaks water with heaping load from a 100 ft. depth...

Wherever deep digging is required and operating spans are long, the new Sauerman Slackline is adding to its margin of superiority over other types of excavators. Production increases of over 25% and in some unusual cases as high as 80% are reported.

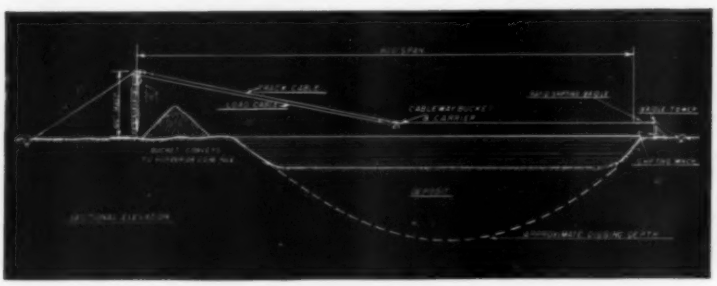
Not only is production increased but operating costs are lowered as cable and hoist wear is reduced and the machine runs with fewer peak loads and shocks—all possible from a cushioned drive using a torque convertor and other refinements.

These benefits are also available to present owners of slackline cableways. Guaranteed Gravel & Sand Co., a Sauerman Slackline user for over 35 years, has increased hoist speeds from 230 to 350 fpm. on the digging cycle and conveying speed to 800 fpm.—a gain of 25%. Guaranteed's 2-cu. yd. bucket is digging 450 ft. away from the surge pile and delivers 150 cu. yds. per hr.

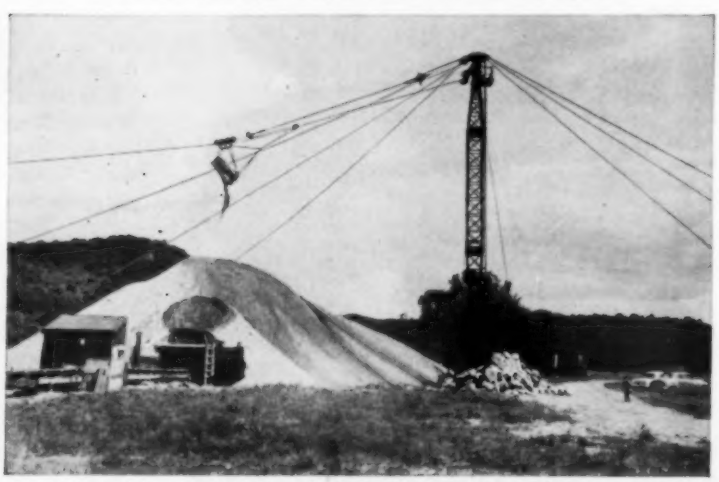
The Sauerman Method lets you work distant material—up to 1,000 ft. away and dig 100 ft. or more below water. Now more than ever the greater tonnage available through fluid drive operation makes a Sauerman Slackline Cableway the low cost way for deep digging.

Get the best machine for your job. Write to Sauerman for expert advice on any materials handling project. For additional information on slackline cableways, ask for Catalog C.

is conveyed and dumped automatically at surge pile.



Above drawing was prepared for a specific slackline installation and does not represent maximum spans. Rapid shifting bridle is not needed for many deposits.



Guaranteed Gravel and Sand Co.'s slackline bucket dumps 150 cu. yds. per hr. on surge pile from digging point 450 ft. away.

SAUERMAN BROS. INC. 634 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS

CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • DUROLITE BLOCKS

continuous *Backbone* teeth...

give *you* these advantages...

Added strength, plus increased load-carrying capacity in smaller space result from the famous "backbone" construction of these gears (formed where the helices meet), where the full face width of each gear tooth is put to work. Because the continuous teeth of all Phillie Gear herringbones are accurately generated on the most modern machines, these gears assure smooth, continuous and highly efficient gear operation . . . year-in and year-out.

If you have a problem involving high horsepower speed reduction under heavy shock loads, specify Phillie Gear Continuous Tooth Herringbones, and be assured of quiet, vibration-free, long-lived transmission of power, for both speed reducing and speed increasing applications.

Learn more about these outstanding gears by requesting Catalog # G-655.

phillie gear®

PHILADELPHIA GEAR WORKS, INC.

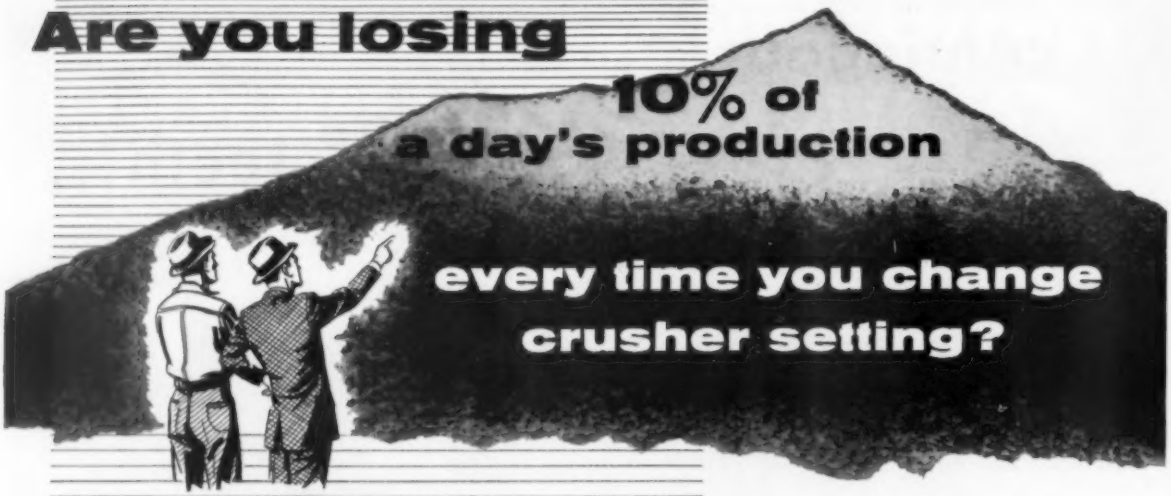
ERIE AVE. & G STREET, PHILADELPHIA 34, PENNA.

Offices in all Principal Cities

INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID AGITATORS • FLEXIBLE COUPLINGS

Virginia Gear & Machine Corp. • Lynchburg, Va.

Are you losing 10% of a day's production every time you change crusher setting?



One-man, One-minute PRODUCT CONTROL

● On some gyratory crushers, it takes 45 minutes and longer to change setting for different product size — in many instances, it takes hours. But even 45 minutes of downtime represents about 10% of your day. You don't have to put up with this lost production —not if you install the *Hydrocone* crusher, the crusher with one-man, one-minute product control.

With the *Hydrocone* crusher (and *only* with this modern crusher) you can change product size at the flick of a switch. Compensating for wear is accomplished just as easily. And if the *Hydrocone* crusher stops under load, just flick the switch and you're in business again.

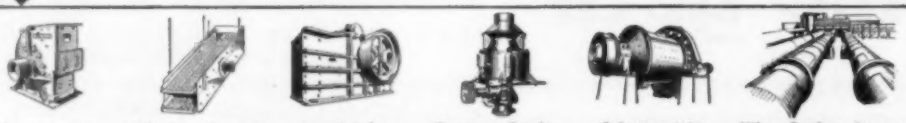
Get all the facts about the *Hydrocone* crusher. See your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 07B7145B.

A-4931

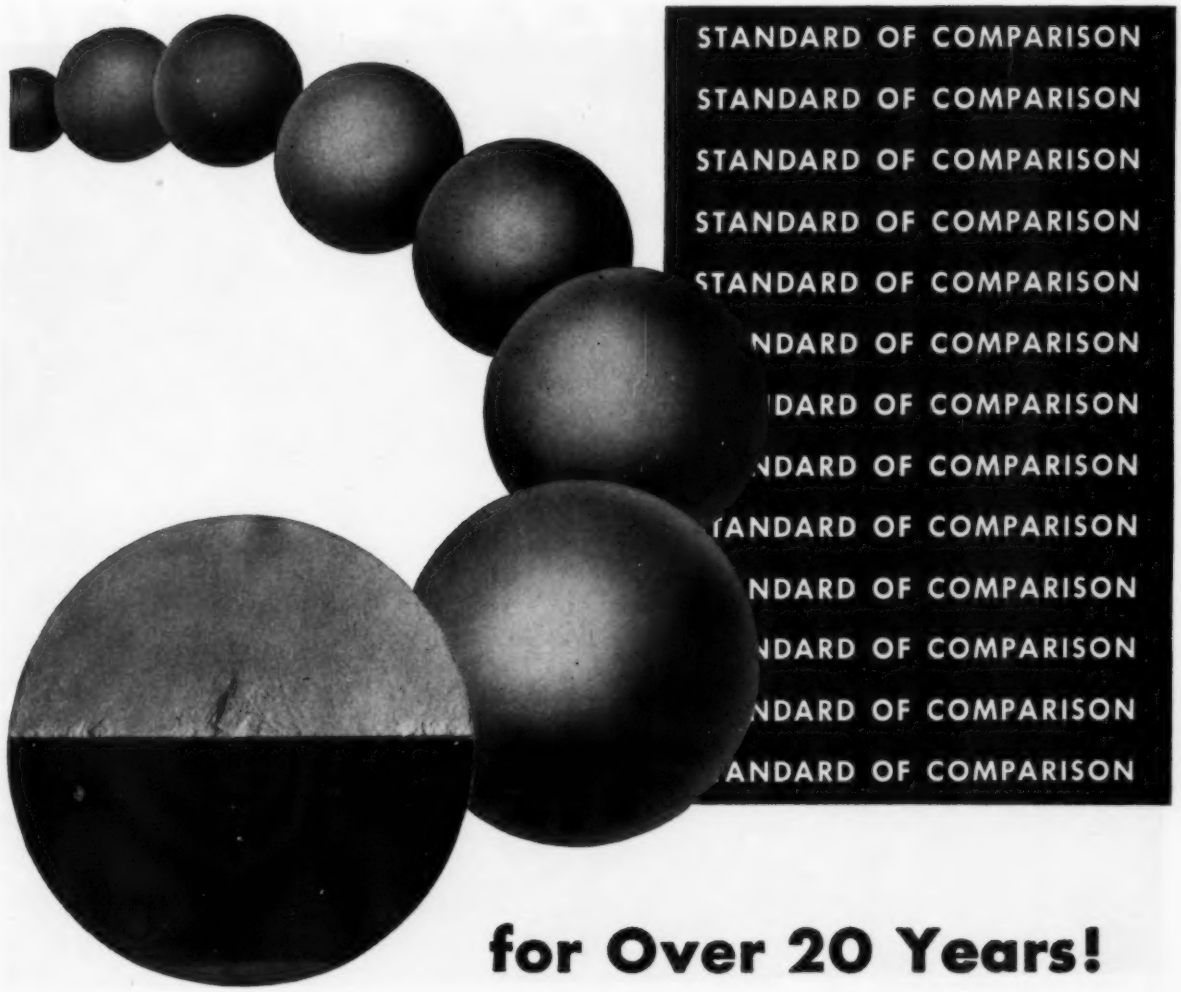
Hydrocone is an Allis-Chalmers trademark.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS



Hammermills | Vibrating Screens | Jaw Crushers | Gyratory Crushers | Grinding Mills | Kilns, Coolers, Dryers



for Over 20 Years!

STANDARD of COMPARISON

SHEFFIELD

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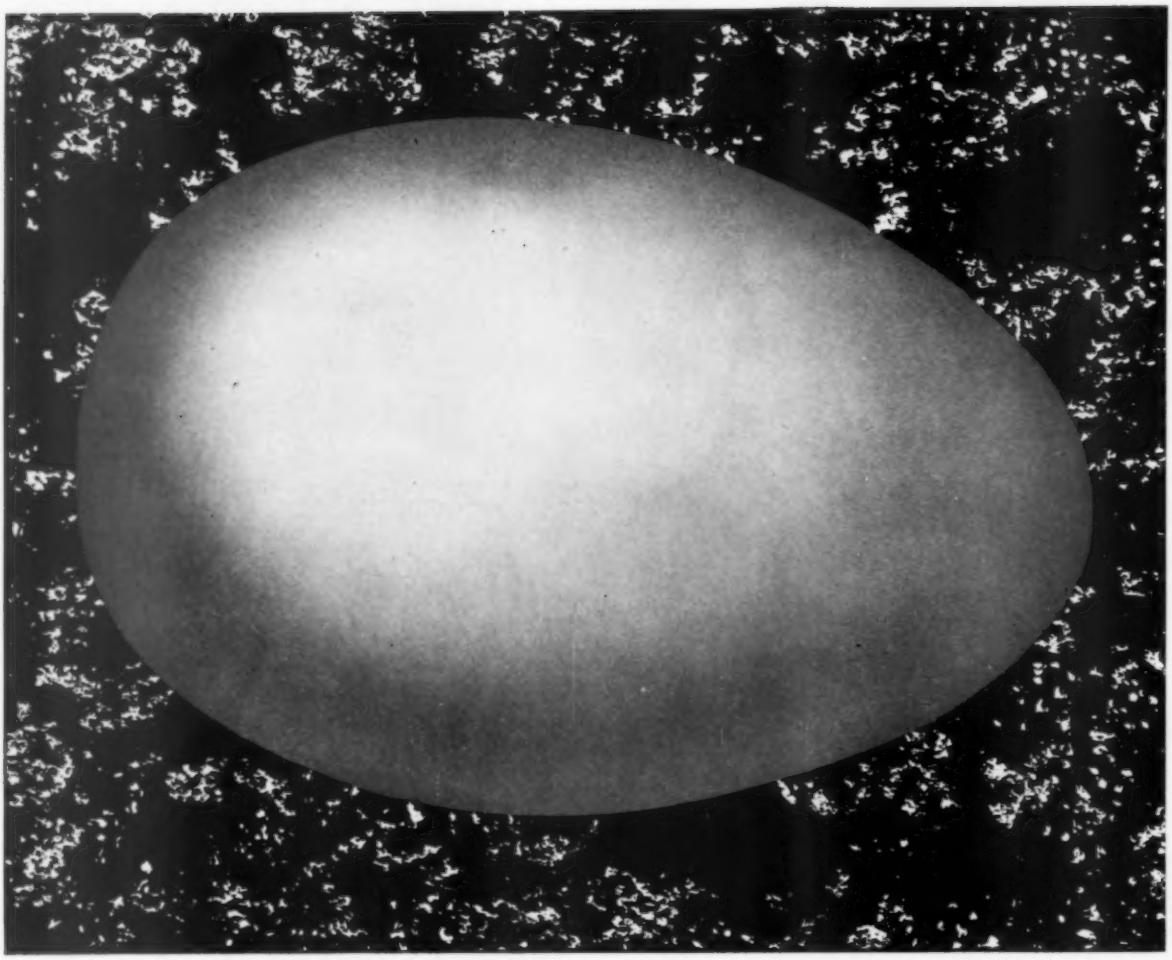
Grinding Balls

SHEFFIELD STEEL
DIVISION
ARMCO STEEL CORPORATION
SHEFFIELD PLANTS: HOUSTON • KANSAS CITY • TULSA

Export Representatives: **ARMCO INTERNATIONAL CORPORATION** Middletown, Ohio



WE LAID AN EGG

Did we fib? Yes, we did in a recent advertisement that featured our new multiwall tuber.

Here's the story. Our engineers worked with those of one of the nation's foremost paper products machinery manufacturers in an effort to develop the finest tuber possible. When it was finished and installed in our Akron plant, we were pretty happy, and, I guess, a little over enthusiastic. We inadvertently said it would outperform anything in the industry, and the next thing we knew, this statement popped up in our advertising.

Now, in all of our advertising, we have been careful to report only what we know to be the truth and, although we feel our new tuber to be an excellent piece of equipment, we are not so sure it will outperform all machines of its kind in the industry. So, we feel this notice necessary to keep our reputation for the truth intact.

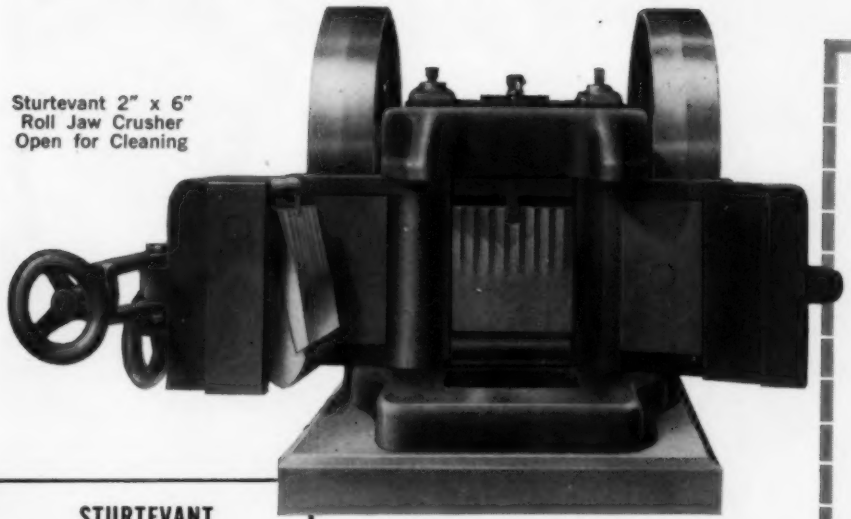
Excellent equipment is important in the manufacture of a quality product, but Thomas Phillips is well aware that there are still other important factors involved. Thus the reason for the very special attention given to *all* phases of this operation to insure you the best in quality and service.

We'd like to show you a few samples of our work in the Small Bag and Multiwall fields. A letter will bring these samples to you, together with our latest brochure.

9939

THE THOMAS PHILLIPS CO.
AKRON, OHIO

"OPEN-DOOR" DESIGN CUTS SAMPLING TIME



Sturtevant 2" x 6" Roll Jaw Crusher Open for Cleaning

STURTEVANT LABORATORY EQUIPMENT

ROLL JAW CRUSHER

First choice for hard rocks. Jaw opening — 2 x 6 in. Approx. capacity: ⅛ in. setting — 700 to 800 lbs. per hr.; ¼ in. setting — 1000 to 1200 lbs. per hr.

CRUSHING ROLLS

Two sizes: 8 x 5 and 12 x 12. Outputs range from ¾ in. to 20 mesh at capacities from ¼ to 10 tons per hr. Performance varies with materials.

SWING-SLEDGE MILLS

For pulverizing soft, hard, tough or fibrous materials ranging from 1 in. to 20 mesh. Feed opening — 5 x 6 in. Capacities at 250 lbs. to 1 ton per hr. for 10 mesh, depending on materials.

SAMPLE GRINDER

Produces samples between 10 and 100 mesh with simple handwheel adjustments. Capacity up to 200 lbs. per hr. with ¼ in. or finer feed.

Small-Scale Duplication of Full-Scale Production

All Sturtevant Laboratory Equipment is ruggedly constructed. So much so that it is used in regular plants for round-the-clock operations. Exclusive "Open-Door" design makes cleaning and maintenance between sample runs quick and easy.

Preferred by laboratories that are proud of their work. Users of Sturtevant Laboratory Equipment represent the "blue chips" in industry and education. Names on request. Check the coupon for full information.

STURTEVANT

Dry Processing Equipment

The "OPEN DOOR" to *lower* operating costs over *more* years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

My dry-process materials are:_____

Desired capacity is:_____

Name_____ Title_____

Firm_____

Street_____

City_____ Zone____ State_____

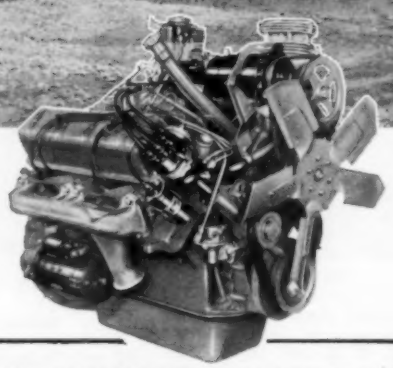
STURTEVANT MILL COMPANY, 104 Clayton Street, Boston 22, Mass.

Please send me your bulletin on Laboratory Equipment ☐

Also bulletins on machines for:

☐ CRUSHING ☐ GRINDING ☐ PULVERIZING
☐ MICRON-GRINDING ☐ SEPARATING ☐ BLENDING
☐ SUPERFINE SELECTING ☐ GRANULATING ☐ CONVEYING

Now! New Heavy-Duty V-8's!



With the most GO under any truck hood!

Powered for the most rugged hauling operations!

These new 206, 226, 257 hp. modern truck V-8's in the new INTERNATIONAL V-Line have the "built-in" reserve power that gets your biggest loads moving *fast* . . . the lively response that keeps them rolling with shifting greatly reduced, even on the toughest construction jobs. You save operating costs and you save trip time.

In short, the new INTERNATIONAL V-Line is built to set new highs in your profit column!

Tested and proved as no other trucks have ever been!

Developed and tested in the lab, then put through more than 1,000,000 test-track miles, and in 2,500,000 on-the-job miles in 39 different truck vocations.

These tests were made by profit-minded truckers with a gimlet-eye on mileage, hauling time and repair bills. Their conclusions—"GREAT, on every count!"

3 Great New INTERNATIONAL V-8 Engines!

	V-401	V-461	V-549
Displacement	400.9 Cu. In.	461 Cu. In.	548.7 Cu. In.
Bore and Stroke	4⅛ x 3¾	4⅛ x 4-5/16	4½ x 4-5/16
Maximum hp.	206 @ 3600	226 @ 3600	257 @ 3400
Maximum Torque	355 @ 1800-2000	420 @ 1600	505 @ 2000

Pressure Controlled-Flo Cooling! Full circulation, fully controlled. Cold weather by-pass.

"Wet" Replaceable Exhaust Valve Guides!

Exhaust Valve Faces and Seats of Stellite!

19 Pound Aluminum Flywheel Housing!

Get all the facts behind this great new truck story. Send for booklet "New Heavy-Duty V-8 Power Where You Need it Most." Write INTERNATIONAL HARVESTER COMPANY, P. O. Box 7333, Chicago 80, Illinois, or see your INTERNATIONAL Dealer or Branch.

INTERNATIONAL® TRUCKS

All-Truck Built to save you the BIG money!

Motor Trucks • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

510,000 lbs. of Du Pont blasting agents used in one of the largest vertical hole blasts ever fired!

1¼ MILLION TONS OF LIMESTONE BROKEN AT DOLESE BROS. CO. QUARRY, RICHARDS SPUR, OKLA.

1. Loaders lower Du Pont "Nitramon"® into holes. Free-running Pelletol No. 1 will be poured around the charge to give maximum energy at the bottom of hole.

2. Before the blast, two hills of limestone roll away from each other. A sinking shot, 100′ x 1000′, will take place across the saddle between the two hills.

3. Mammoth blast blossoms skyward. Powerful Du Pont charge was loaded in 208 holes on 25′ x 25′ pattern. Hole depth averaged 90′, varied from 50′ to 110′.

4. Result of the record-making blast can be seen against the horizon. The gap between the two hills has been filled with a swell of well-broken limestone.

5. View of about half of the 1000′ blast. Du Pont MS-9 Connectors were used to delay each hole, reduce vibration and control the direction of the throw.

6. Close-up of the blasted stone shows the excellent fragmentation produced by the Du Pont Blasting Team. Easy loading—and another fine job done!

GREATER SAFETY is the added premium you receive from the Du Pont Blasting Team. "Nitramon"—even with its powerful spreading action—is the safest blasting agent known. It is unaffected by flame, friction, ordinary caps or rifle bullets. MS Connectors increase safety by keeping caps off the firing line until you're ready to shoot! For further information, write E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

DU PONT BLASTING AGENTS

Products of Du Pont Explosives Research

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

America has homework to do!

THERE'S PROBABLY a lot about your town that makes you want to brag a bit about it.

But there's one thing you *can't* be proud of. And it's a shame you share with just about every other community in America.

The homes where far too many people live are a disgrace. Slums, semi-slums, housing blight are with you. Fixing them up is the homework to be done.

If your town is like most in the U. S., here's what the figures show: 1 out of every 10 homes are rock-bottom slums. Nearly one-half urgently need basic repairs.

But slums are something that is happening on the other side of town, you may say. The problem isn't mine.

Slums are YOUR homework

Distance is no barrier against the threat and cost of housing blight.

Your taxes go up because it takes more money for your town to fight the diseases and delinquency and poverty spawned in the slums. The security of your family goes down because the slum is the natural parent of crime.

Where your business comes in

Every firm has a responsibility toward the town where it's located. Part of it is to support community improvements as any other good citizen would.

Some slums are beyond repair. They must be torn down and a fresh start made. Others can be made to conform to accepted living standards. So it is up to you to get behind every sound program which seeks to provide adequate housing for all our people.

Civic and individual groups must have business backing . . . *your* firm's backing if they are to succeed.

Follow the course of Action!

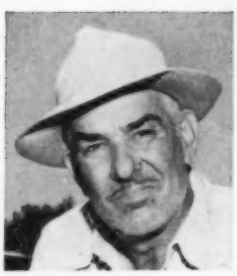
A group of Americans from every walk of life has joined together in a non-profit organization to combat home and community deterioration, A.C.T.I.O.N., the American Council To Improve Our Neighborhoods.

Send today for a free copy of "ACTION." It explains what A.C.T.I.O.N. is and proposes to do. It lists booklets, research, check-lists, and other material which can help you. Address P. O. Box 500, Radio City Station, New York 20, N. Y.

ACTION

American **C**ouncil **T**o **I**mprove **O**ur **N**eighborhoods

"We've used our AMSCO® pump since 1947 . . . no major breakdowns experienced yet"



Pacific Pebbles, Inc., have been operating their 12″ Amsco pump continuously since its installation in 1947. The pump operates on a 30-foot pipeline with a 30-foot lift. According to Mr. C. H. Baker, plant superintendent, this Amsco pump has operated with a minimum of maintenance and no major breakdowns during that period.

Mr. Baker estimates that the shell had an average life of 12 to 16 months and the impeller 6 to 10 months. Pacific Pebbles uses Amsco pipeline fittings and welds to build up the shell.

Mr. Baker states, "In over 25 years of using Amsco pumps, I have been more than pleased with their good service and small maintenance . . . which accounts for the no-major-breakdown record that I am proud of."

QUICK FACTS ABOUT AMSCO PUMPS

Whether your dredging operation is large or small, you can get an Amsco Dredge Pump to handle the job. Standard sizes range from 6″ to 20″ discharge openings. Larger sizes are also available. An Amsco Pump Engineer will be glad to discuss your requirements, or write for Bulletin 1052P, giving full information and specifications on the Amsco line.

AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS, JOLIETTE, QUEBEC

For producers of

The Whole Construction Story wrapped up in one Gigantic Package!

A.R.B.A. ROAD SHOW and CONVENTION

International Amphitheatre—Chicago

Almost 10 years since the last Road Show has seen vast changes —changing personnel in your organization—new people and expansion. Field operations cannot possibly permit the fullest study or comparison of equipment and the press of business reduces the opportunity for learning all there is to know of new methods.

The A. R. B. A. Road Show and Convention will bring you the whole construction story wrapped up in one package. 300,000 sq. ft. of equipment—over 1,000 pieces of machinery—down-to-earth discussions by leading construction authorities—a 6-day opportunity to "catch up" on all that's new in construction.

The tremendous immediate future of the industry warrants your planning to be there. Write for data on reservations. Ask to be put on the list for future information on the 1957 A. R. B. A. Road Show and Convention.

The 10 Best Reasons Why You Should Not Miss The A.R.B.A. Road Show and Convention

1. First Road Show in nearly 10 years!
2. The best way to "catch-up" on latest advancements in equipment, materials and methods.
3. Helps you determine best buys in machinery through first-hand comparisons.
4. Gives you information you need to improve your operating efficiency.
5. Hear top-ranking specialists in all phases of highway, street and maintenance work.
6. Learn how latest Federal Government plans and regulations will affect YOU.
7. Meet leading Federal, State, County and Municipal authorities.
8. Discuss equipment and service needs with manufacturers and distributors.
9. Swap ideas with construction and maintenance experts from all over the world.
10. Renew old contacts . . . make new friends.

AMERICAN ROAD BUILDERS' ASSOCIATION

World Center Building Washington 6, D. C.

For producers of Concrete Building Units, Pipe and Ready-Mixed Concrete

JULY 1956

THE CONCRETE MANUFACTURER

A SPECIAL SECTION OF PIT AND QUARRY

An Example of the Use of Split Concrete Stone In a San Antonio, Texas, Residence. (See Page 318.)

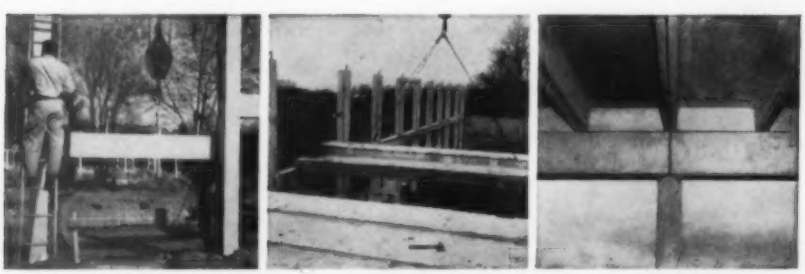
Housing Milestone

Precast 'Incor' Concrete Framing Cuts Erection Time and Cost on Big Philadelphia Housing Project

● Philadelphia, City of Homes, writes a bright, new page in the record of low-rent housing progress by providing comfortable, fire-safe dwellings for 412 families in its 500,000-sq.-ft. Liddonfield Housing Project, at a cost of less than $8. per sq. ft. of floor area.

Use of precast 'Incor' concrete columns, floors and roof decks for the 52 two-story buildings made possible assembly line speed in erecting the 20-ft.-wide units, ranging in length from 150 to 200 ft., at the rate of two a week.

All units were fabricated with 'Incor' 24-Hour Cement for fast, economical production and erection. You *know* what 'Incor'* will do . . . always dependable high early strength fits into well-scheduled, assembly-line production, assuring maximum output from the form investment . . . smooth-working mixes speed placing, improve appearance . . . sound reasons for insisting on America's FIRST high early strength portland cement. *Reg. U. S. Pat. Off.



First step is erection of two-story columns and spandrels. Next, 3-ft.-wide precast floor channel slabs are placed across building's full width. Right, under side of floor—smooth concrete surfaces only require painting.

PHILADELPHIA HOUSING AUTHORITY
LIDDONFIELD HOUSING PROJECT

Architects:
LIDDONFIELD ARCHITECTS OF PHILADELPHIA

Civil Engineers:
BARTON & MARTIN
Philadelphia

General Contractor:
STOFFLET & TILLOTSON
Philadelphia

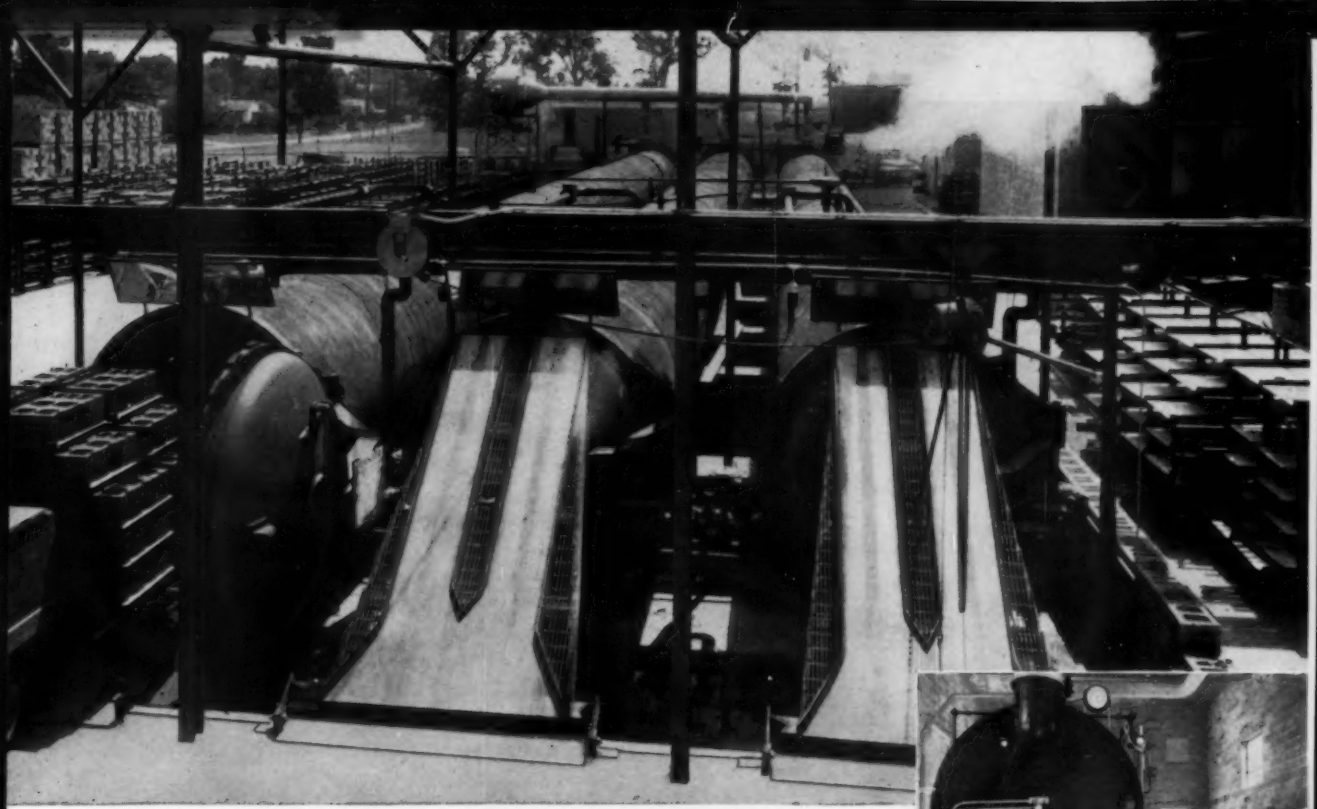
Precast Members Made and Erected by
FORMIGLI CORPORATION
Berlin, N. J. • Philadelphia, Pa.

LONE STAR CEMENTS COVER THE ENTIRE CONSTRUCTION FIELD

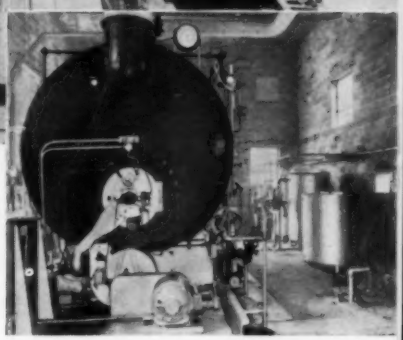
LONE STAR CEMENT CORPORATION

Offices: ABILENE, TEX. • ALBANY, N. Y. • BETHLEHEM, PA.
BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON
INDIANAPOLIS • KANSAS CITY, MO. • NEW ORLEANS • NEW YORK
NORFOLK • RICHMOND • WASHINGTON, D.C.

LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 18 MODERN MILLS, 38,000,000 BARRELS ANNUAL CAPACITY



More than 18 months of research and development by Southern Block and Pipe Corp., preceded the development of the modern process.



New 600-hp boiler "speaks with authority," providing entire steam supply for this progressive firm. Starting service and operator instruction are furnished without extra charge — an important *extra* bonus for specifying Cleaver-Brooks boilers.

New "high-pressure" block plant sets new record with Cleaver-Brooks 600-hp boiler

Automatically steam-cures 20,000 blocks and 150 tons of pipe and shapes per day

SOUTHERN Block and Pipe Corp., Norfolk, is to be congratulated on its impressive, record-setting achievement. This newest and most modern block plant in Virginia is a perfect pin-point example of the very latest in applied concrete products technology . . . *and why it pays to buy steam power with a punch!*

Consider what it takes to do all this:

- Steam-cure *five* high-pressure autoclaves of 8 x 8 x 16 in. block per 16 hours — or a total of 12,000 blocks.
- Steam-cure from *four to six* low-pressure (50 psi) kilns of block — each kiln containing 1400 blocks.
- Furnish steam for *six* additional kilns to cure 150 tons of concrete pipes and shapes.

Southern Block's new Cleaver-Brooks 600-hp boiler burns No. 6 fuel oil at an average rate of 1250 to 1500 gals. per 16-hr. day. Boiler operates continuously for 16 hours — at 140 psi at a maximum stack temperature of 400°F.

An outstanding maintenance job is being done by the steam engineer in charge. Daily checks are made on feedwater, oil consumption, water evaporation, and condition of all equipment in the cycle. Records prove that due to efficient operation and care, this plant is maintaining an average fuel-to-steam efficiency of *80% or better*. One more convincing demonstration of the day-in, day-out reliability and economy of Cleaver-Brooks' modern four-pass, forced draft boiler design.

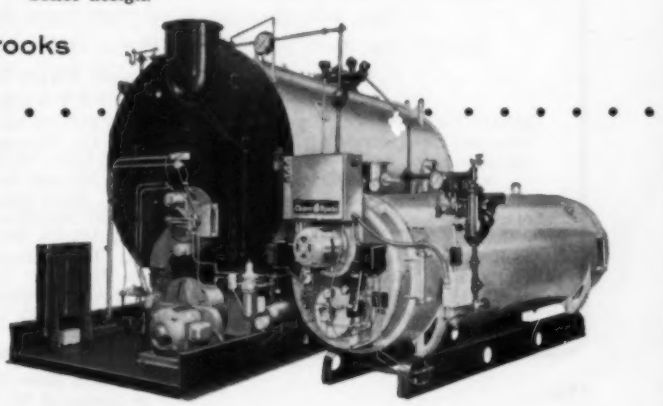
Steam needs... large or small... Cleaver-Brooks has the answer to them all

Cleaver-Brooks offers you a choice of 18 sizes, 110 models for oil/gas or combination oil/gas firing — in the range of 15 to 600 hp. Competent sales agents in principal cities assist you without obligation. For complete data, write:

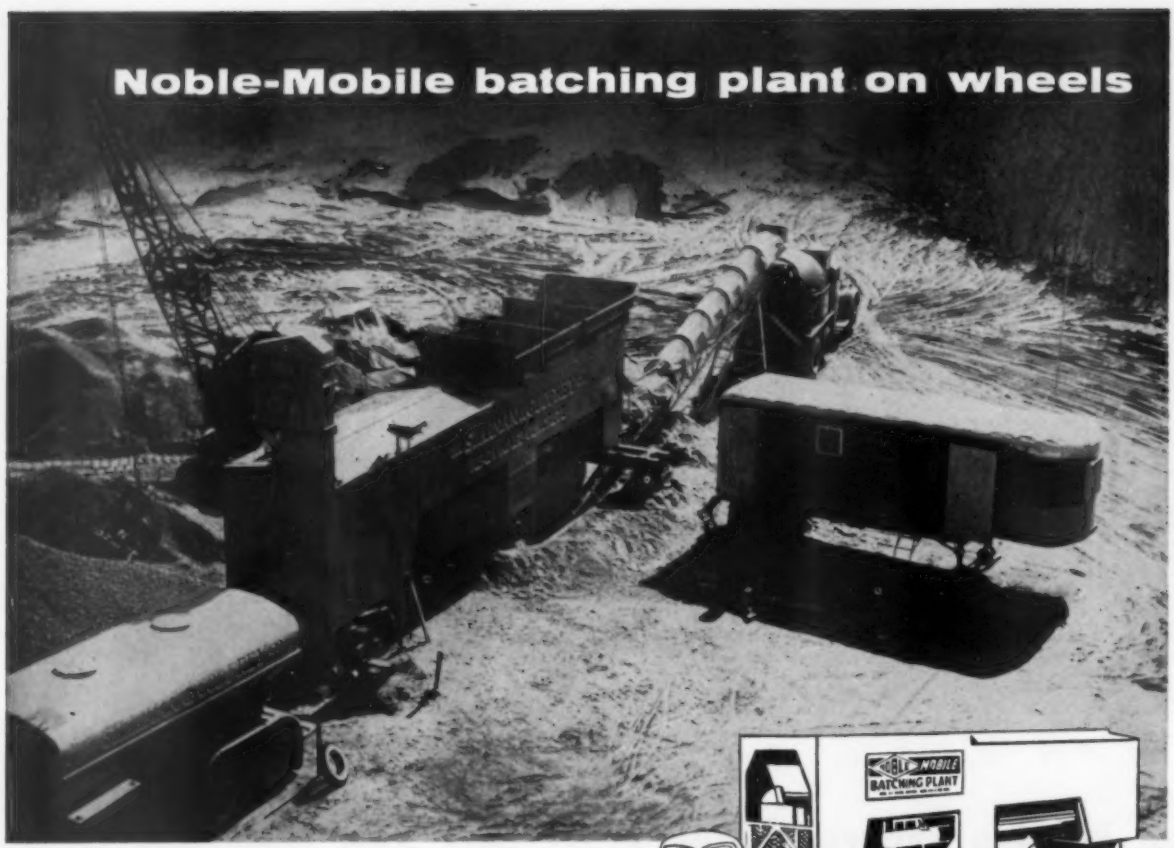
CLEAVER-BROOKS COMPANY
Dept. H, 347 E. Keefe Ave., Milwaukee 12, Wisconsin, U.S.A.
Cable address: CLEBRO — Milwaukee — all codes.

Cleaver Brooks® 25th YEAR

TWENTY-FIVE YEARS OF LEADERSHIP BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER



Noble-Mobile batching plant on wheels



lets you batch at site of fringe jobs and makes those jobs pay

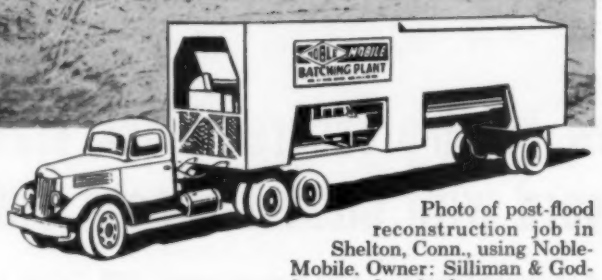


Photo of post-flood reconstruction job in Shelton, Conn., using Noble-Mobile. Owner: Silliman & Godfrey, ready mixed concrete.

Haul Noble-Mobile to job site like a semi-trailer • Set up in one day—no wiring, footings or crane time required • Charge aggregates with front end loader, crane or conveyor • Plant utilizes bulk cement—cement batched automatically • Excellent quality control • Maximum production from mixer trucks—short hauls, more yards per day • Production capacity 60 to 100 yards per hour. Covered by patents pending.

NOBLE BATCHING PLANTS

Portable, semi-portable or stationary plants designed and built by Noble Company · 1860 - 7th St., Oakland 20, Calif. TEmplebar 2-5785

Other Noble Company offices: 20950 Center Ridge Road, Cleveland 16, Ohio. EDison 1-3426.
518 First Ave. North, Seattle, Wash. MUtual 4878 · 117½ W. Manchester, Inglewood, Calif. ORegon 8-4457.
International Sales Agent: Frazar International Corp., San Francisco

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BIRMINGHAM, ALA., Equipment Service Co. • PHOENIX, ARIZ., Superior Equipment Co. • VANCOUVER, B. C., Westcoast Equipment Co., Ltd. • DENVER, COLO., Western Machinery Co. • BALTIMORE, MD., General Supply & Equipment Co., Inc. • CEDAR RAPIDS, IOWA, James W. Bell Co. • INDIANAPOLIS, IND., Manwaring Machinery Co. • DETROIT, MICH., R. G. Moeller Co. • ST. PAUL, MINN., Borchert-Ingersoll, Inc. • CLEVELAND, OHIO, Wepco Equipment Co. • LOS ANGELES, CALIF., Smith-Booth-Usher Co. • PORTLAND, ORE., Loggers & Contractors Machinery Co. • PHILADELPHIA, PA., Furnival Machinery Co. • PITTSBURGH, PA., Equipment & Supplies, Inc. AMARILLO, TEXAS, Plains Machinery Co. • DALLAS, TEXAS, North Texas Equipment & Supply Co. • HOUSTON, TEXAS, Boehck Engineering Co. • EL PASO, TEXAS, Border Machinery Co. • WACO, TEXAS, Richards Equipment Co. • SAN ANTONIO, TEXAS, Contractors Machinery Co. • SALT LAKE CITY, UTAH, Arnold Machinery Co. SEATTLE, WASH., Star Machinery Co. • SPOKANE, WASH., Intermountain Equipment Co. • CASPAR, WYOMING, Studer Tractor & Equipment Co. • MONTREAL, QUE., Laurent de Equipment Co., Ltd. • WINNIPEG, MAN., Huggard Equipment Co., Ltd.

The CONCRETE MANUFACTURER

July 1956

How Well Do Your Employees Sell Your Business?

RECENTLY, we were given the results of a "shopping" trip made to a half-dozen ready-mixed concrete firms doing business in a large Midwestern city. Our inquisitive informant was a layman—one of the millions of the "John Q. Public" type, who in the long run buy everything that is sold. In this tour he had asked a number of questions of each firm on how to pave a porch with ready-mix. He had said he wanted to "do-it-himself," asked how much concrete would be required, what tools would be needed, how to obtain the proper mix, and inquired about other technical details. But he didn't fare so well in getting the right answers.

He related to us the results of his "survey," based on the treatment he was accorded, and on the answers he *didn't get* from the men he talked with—men who are supposed (we assume) to be able to clinch a sale if it comes in the door as this one did. Only one of the six interviewed would have been given an order, as that salesman was the only one who had exhibited even a modicum of interest in the prospect's problems or offered him any tangible information.

The experience of this man tickled our inquisitive imagination. By phone, we checked a few firms producing concrete. We asked typical questions designed to bring out the worthy or unworthy in the salesmen(?) who answered our calls. Try it some time! Then you'll understand what we mean when we say that our quest brought forth few satisfying answers!

These experiences caused us to wonder if this lack of interest is typical of the people employed by concrete producers, people whose duties include contact with the public, those who are supposed to further the sale of the product offered. We made a few other inquiries, and some *quasi* research, on the subject of how much concrete — ready-mix or block—goes into small jobs similar to the hypothetical one described. We were surprised to find out that it represents a sizable portion of the whole. More to the point, such business comes in with practically no sales expense, making it all the more desirable.

The big question today is not how much better to make our product, but how to sell what we already have. Reams have been written on the subject of selling; and millions are spent in advertising. We have no way of actually knowing whether the high percentage of cold turn-downs described truly represents what is happening today in our industries, but we have a sneaking suspicion that it isn't far out of line. And perhaps those reams of pages and millions of dollars are being frittered away in good part, by the careless action of many of our front men—clerks or salesmen—who are indifferent to the caller with an order in his hand!

Ray L. Peck

This is the 132nd of a series of ads, featuring leaders of the Concrete Products Industry who are stepping up block production with Besser Vibrapac machines.

Another BESSER BOOSTER

"Our Vibrapacs produce as well today as they did when installed 9 years ago"

(right) Two Vibrapacs in the Chambersburg plant of the Nitterhouse Concrete Products Co.

(below) Special truck-mounted device for loading and unloading cubed block.

(above) Yard scene showing stockpiles of block, all made on Vibrapacs.

(left) Block are handled with a Besser Bridge Crane Block Cuber. No manual lifting.

This very sincere comment was made by T. K. Nitterhouse, owner of Nitterhouse Concrete Products Company, Chambersburg, Pennsylvania.

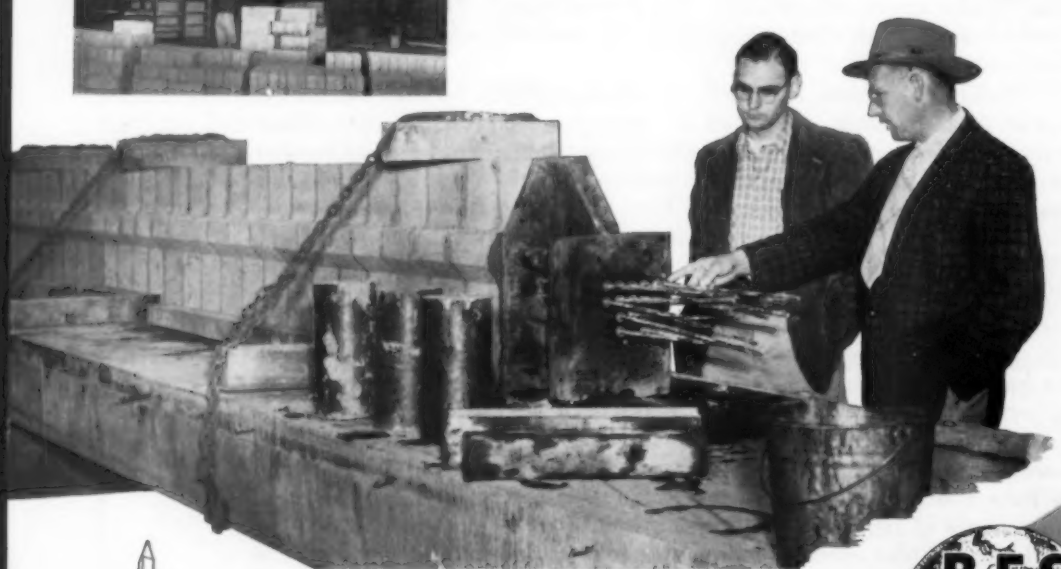
Mr. Nitterhouse's first Vibrapac was installed in 1946, and another one was added a year later. Today, both machines are still giving very satisfactory performance. As this enthusiastic block maker puts it: *"The Vibrapac is the best high production block machine available for producing high quality units of all sizes".*

In addition to standard wall units, Nitterhouse also produces concrete floor and roof systems, pre-stressed beams and split block under the trade name of "Random Rock". Several years ago a second plant was started at Windber, Pennsylvania, where another Vibrapac was installed.

Frankly, don't you think this preference for Vibrapacs implies complete satisfaction?

BESSER COMPANY · **Box 131, Alpena, Mich., U.S.A.**

Complete Equipment for Concrete Block Plants



(left) T. K. Nitterhouse pointing to a system of pre-stressed Vibrapac Block beam at the Chambersburg plant. His son William is standing in the background.

NATIONAL HOUSING CENTER, WASHINGTON, D.C., where Besser maintains a permanent exhibit of concrete masonry. Be sure to visit this fine display.

BESSER VIBRAPAC

first in concrete block machines

A 8807

News of the Concrete Industries

P.C.A. Laboratory Units Will Provide Expansion Of Fire, Precasting Study

It was recently announced by G. Donald Kennedy, president of the Portland Cement Association, that the association will construct two new buildings at its research and development laboratories in Skokie, Ill. To be built at an estimated cost of $1,800,000 including equipment, the new buildings will accommodate expanded research efforts on concrete structures and the fire resistance of concrete.

Plans for the structural development laboratory and the fire research center call for structures measuring 56 by 176 ft. and 56 by 220 ft., respectively. The main portion of each building will consist of a single large room 40 ft. high. Identical precast structural members will be used for these areas in both buildings.

Described by Dr. A. Allan Bates, P.C.A.'s vice-president for research and development, as in effect "one giant testing machine," the structural development laboratory will not employ conventional testing machines. Equipment will be constructed as required from structural steel shapes and hydraulic jacks.

It was reported that one of the first projects that will be undertaken in the laboratory is a study of various types of connections used with precast structural members. Another high-priority plan calls for extensive study of concrete floor slabs.

Initial emphasis in the fire research center will be placed on determining the fire resistance of pre-stressed concrete. The center will ultimately contain six furnaces large enough to handle tests on full-scale beams, columns, walls, and floor slabs.

Dr. Bates stated that the buildings were made necessary by significant advances in concrete technology and structural design. Designed by Dunlap and Esgar Inc., of Chicago, in co-operation with the P.C.A. staff, the buildings are scheduled for completion next year.

Ross Adams, formerly in the Chicago office of the Portland Cement Association, has been named P.C.A. public relations director for Los Angeles.

● Officers and directors of the New York State Concrete Masonry Association, Inc., are shown at the association's semi-annual meeting held recently in Syracuse, N. Y. Seated (left to right) are: William C. Homer, Syracuse, vice-president; Henry C. Quaritius Jr., Brooklyn, president; and Lawrence Dagostino, Schenectady, treasurer. Standing (left to right): Lee Taylor, Watertown; Harvey Black, Rochester; John D. Daly, Auburn; and Salvatore Picone, Brooklyn, all directors; and Robert Abbey, executive secretary. Those not in the picture are Alfred L. Cossitt, Hamilton, secretary, and Frederick W. Reinhold, Buffalo, a director.

Coming Events

July 29-August 1—Atlantic City. Summer meeting, National Cinder Concrete Products Association, and annual conference, Light Weight Block Manufacturers (Eastern Concrete Products Association). Haddon Hall Hotel.

October 1-3, 1956—Pebble Beach, Calif. National Ready-Mixed Concrete Association directors' meeting. Del Monte Lodge.

October 22-26, 1956—Chicago. 44th National Safety Congress and Exposition. Conrad Hilton, Congress, Morrison, and La Salle hotels.

November 12-19, 1956—Tucker's Town, Bermuda. Eighth annual convention and meeting, American Concrete Pressure Pipe Association. Castle Harbour Hotel.

February 11-14, 1957—Los Angeles. 27th annual meeting, National Ready Mixed Concrete Association. Statler Hotel.

Cook Brothers, Los Angeles Put On Equipment Cavalcade

Cook Brothers of Los Angeles, Calif., producer of truck and truck mixer equipment, held its second biennial equipment cavalcade on April 20 and 21 at the main office on San Fernando Road. More than 50 pieces of equipment were displayed to the 1,800 visitors who saw the two-day show.

The purpose of the exhibition was twofold: to introduce the new line of front-mounted semi-trailer dumps, front-mounted dump bodies, and new hoists; and to display equipment manufactured and distributed by the company to the construction industry. One special feature was an American crane with a 150-ft. boom on a Cook Brothers carrier. Another was the new Challenge Pacemaker mixer, of "engine-take-off" type, featuring simplicity of design, lightness, and ease of operation.

Matt M. LaVail has been named district sales manager of the Featherlite Corporation, Dallas, Tex., according to a recent announcement of Jack Frost, president of the firm, which produces expanded shale aggregate. Mr. LaVail has been associated with the construction industry for several years as a specialist in lightweight aggregates and concrete.

Dodds & Fountain Expand—New Concrete Products Plant Begun at Tyler, Tex.

Construction of a new plant for the manufacture of precast concrete products was begun recently by Dodds & Fountain Building Products, Inc., on an 8-acre site in Tyler, Tex. With a capacity of 1,000,000 units a year, the plant will be fully automatic, incorporating the most modern processing equipment.

By August 1 Haydite lightweight blocks, Rane-Bo stone, and numerous precast concrete building products will be in production.

Officers include J. C. Fountain, president; J. G. Lester, vice-president; and W. V. Fountain, secretary-treasurer.

Concrete Contractors Assn. Names St. Clair Exec.-Secy.

James D. St. Clair, recently appointed executive-secretary of the Concrete Contractors Association, will direct the activities of the 300-member organization from its headquarters in Chicago. Included among his duties for the association, which represents management in the concrete industry, will be co-ordinating committees; aiding in labor relations; and staging shows, outings, banquets, and conventions.

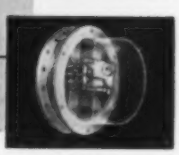
J. D. St. Clair

Mr. St. Clair was an engineer for the Cook County (Ill.) Highway Department before joining the association. He spent 4 years in the Military Air Transport Command in World War II, and was instrumental in distributing the veterans' bonuses in Illinois.

BULK MATERIAL CONTROL under Pressure or Vacuum

New Roto-Bin-Dicator mounts outside bin, at any angle, for bin level signaling or machinery control. Material loads on paddle actuate Micro switch in motor housing. Flexible paddle shaft permits use with large or lumpy materials when standard diaphragm indicators are impractical.

BIN-DICATOR
BIN-FLO AERATOR



Low pressure air diffuser assures steady flow of fine, dry materials that tend to pack in storage.

The original diaphragm-type bin level indicator for all ordinary applications.

Complete Illustrated Literature FREE

THE BIN-DICATOR CO.
13946-WI Kercheval • Detroit 15, Mich.
Phone: VAlley 2-6952

WE SELL DIRECT • PHONE ORDERS COLLECT

Lightweight Slag Output Expanded by Waylite Co. In New $750,000 Plant

Waylite Company, producer of lightweight slag aggregates, recently announced that a new $750,000 plant for the production of Waylite aggregates from blast furnace slag is being built at Youngstown, Ohio. This plant will obtain its basic slag from the furnaces of the United States Steel Corporation at Youngstown. The finished product will serve users in Ohio, Pennsylvania, and eastern Michigan.

With this new production, the company's total annual output from eight plants will be 2,000,000 cu. yd. In addition to the Youngstown installation, Waylite now operates plants at the following blast furnace locations: Duluth, Minn. (at Interlake Iron Corp.); two plants in Chicago (at Interlake Iron Corp. and Youngstown Sheet and Tube Co.); Steelton, Pa. (at Bethlehem Steel Co.); Swedeland, Pa. (at Alanwood Steel Co.); and two plants in Bethlehem, Pa. (at Bethlehem Steel Co.).

John W. Weber Appointed To Staff of A.C.P.A.

John W. Weber has been appointed assistant to Howard F. Peckworth, managing director of the American Concrete Pipe Association, Chicago, Ill. He was formerly with the Chicago Rock Island and Pacific Railroad Company as office engineer in the bridge department.

Mr. Weber received his B.S. in civil engineering at the Illinois Institute of Technology. He also attended John Carroll University, Cleveland, and New Mexico School of Mines, Socorro.

Cellular Lightweight Concrete Now Produced by Denver Firm

Formation of a new company, to be known as the Colorado Durox Corporation, was recently announced by Karl Langnefors, president of the firm. It will operate under a franchise from the parent Swedish firm which holds the patents for the manufacture of Durox steam-cured, cellular gas concrete.

A $500,000 plant will be built near Littleton, Colo., a suburb of Denver, for the manufacture of floor and wall slabs and other forms of the material. Durox was developed in Sweden in the early 1920's and is much used there for constructing building walls and partitions. It is claimed that Durox may be drilled, sawn, and nailed, and that its insulation qualities are high.

Wire Reinforcement Inst. Names Smith President At Annual Meeting

Ivy H. Smith, Jacksonville, Fla., was named president of the Wire Reinforcement Institute for the coming year at the recent annual meeting of the organization at White Sulphur Springs, W. Va.

Ivy H. Smith

Mr. Smith is president of the Sherman Concrete Pipe Company, which manufactures reinforced concrete pipe, and of the Ivy H. Smith Company, which makes reinforcing fabric. Several years ago Mr. Smith served as president of the American Concrete Pipe Association.

Texas Industries Affiliate Names Petroskey Sales Mgr.

Texcrete Structural Products Company, an affiliate of Texas Industries, Inc., Dallas, Tex., has appointed E. C. (Pete) Petroskey sales manager, according to a recent announcement made by Jean F. Devine, vice-president and general manager.

The subsidiary company, recently acquired by Texas Industries, produces precast concrete roof and floor channels and other concrete elements used in commercial and industrial buildings. Mr. Petroskey joined Texcrete Structural in 1954 as a sales specialist, having been in the precast field for 35 years.

E. C. Petroskey

Courses in Block Sponsored By Wisconsin C.P. Associations

The first of three courses on the types, properties, and uses of concrete block was held in the Milwaukee public auditorium on June 6. In the class were architects, engineers, contractors, masons, and apprentices who are interested in this form of construction. The meetings, sponsored by the Wisconsin Concrete Products Association and the Milwaukee Masonry Industries, were held one week apart.

Felix Wierman, Milwaukee housing engineer for the Portland Cement Association, conducted the meetings. It is planned to hold other meetings at various points throughout the state.

BETTER BUILT with Versatile Concrete Masonry

A-1 Block Company

1234 Concrete Boulevard

Bloktown, Illinois

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• Job site signs for use on concrete masonry construction jobs have been made available by the National Concrete Masonry Association. The sign is printed on weather-proof fabric in color; it is priced to members at cost and is furnished unmounted for use on trucks or in windows.

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Parquet wood flooring on Elastizell-type concrete slab

Concrete made with this material is . . .

• HIGHLY MOISTURE-RESISTANT

Elastizell-type slab is dry. On it can be used any kind of floor covering—cork or rubber tile, linoleum, parquet-type wood flooring, wall-to-wall carpeting!

• SELF-INSULATING

Elastizell-type slab, with its "warm-to-the-touch" feel, permits maximum performance of whatever the heating system. Hence, floor-to-ceiling living comfort!

AMONG OTHER USES OF ELASTIZELL-TYPE CONCRETE . . .

- as light weight, easy-to-handle floor fills in multi-storied construction.
- as light weight, insulating roof fills.
- as light weight structural members.
- as insulation for underground pipe lines.
- as precast slabs and panels.

Write, wire or 'phone . . .

ELASTIZELL CORPORATION OF AMERICA

158 FLETCHER STREET • ALPENA, MICHIGAN

'PHONE 1080

New A.C.I. Headquarters Proposed in Detroit Area Shows Scope of Concrete

A new American Concrete Institute building, designed by Minoru Yamasaki, architect, features a folded-plate reinforced concrete roof system. The structure will employ concrete in several forms and will serve as headquarters for the society's increasing technical activities. It will be located in Detroit's northwest residential area, overlooking the rolling terrain of a municipal golf course. Initial construction is planned for early 1957.

The roof system, cantilevered front and rear from concrete interior corridor walls, projects over the exterior walls of precast concrete panels and glass, shields them from summer sun, and reduces the air conditioning load. The shorter end walls are shielded by perforated screens of colored concrete pipe sections, laid up to expose the ends to view.

Motivation for the new building is A.C.I.'s recent membership growth and increased technical activities, which necessitated more efficient working space. It was also felt that A.C.I. headquarters should reflect the technological developments in concrete which it has fostered throughout its 52-year history. By increasing the institute's working efficiency, the new headquarters will enhance A.C.I.'s role as the source of technical information and standards for the concrete field.

This model shows the unusual design of the proposed A.C.I. building in Detroit, Mich.

The eighth annual convention and meeting of the American Concrete Pressure Pipe Association will be held at the Castle Harbour Hotel, Tucker's Town, Bermuda, the week of November 12-19, 1956.

OBITUARIES

Louis F. Nappi, president of the Empire Concrete Block Company, Trumbull, Conn., died on March 27, at the age of 43.

Delmar McArtor, assistant secretary and treasurer of Universal Concrete Pipe Company, Columbus, Ohio, died on May 12. He was 59 years of age.

Timothy Curtin, partner in Curtin Brothers, Inc., Little Ferry, N. J., a ready-mixed concrete firm, died on June 12, at the age of 61.

H. A. Spindler, founder of the Spindler Concrete Pipe Company, Columbus, Ohio, died in that city on March 17, at the age of 73.

Chesley Allen Chipley, president of Victoria Ready Mix Concrete Company, San Antonio, Tex., died on April 15, at the age of 51.

Robert T. Jardine, superintendent of the Bennett Concrete Stone Company, Cleveland, Ohio, died on March 12. He was 69 years of age and had served as superintendent for the last 33 years.

Officials of the Spartanburg Concrete Company, Spartanburg, S. C., ready-mix concrete producer, recently announced a $250,000 expansion for manufacturing concrete pipe. Two pipe-making machines of the latest type will be installed to turn out pipe up to 60-in. diameter in 6-ft. lengths. The original plant, completed two years ago at a cost of $400,000, also makes concrete block of all types.

TEL-A-SLUMP in your truck mixers gives you greater profits through *in transit* slump control

With TEL-A-SLUMP in your truck mixers, they pour immediately upon reaching the job with no costly delay to adjust slump —that's been done on the way. This *in-transit* slump control not only saves time and money, it eliminates guesswork and increases your customers' confidence in your concrete. There are two models of the TEL-A-SLUMP — indicating and indicating-recording. Write today for full information.

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Electronic-Hydraulic Automation *Yields*

Increased Output

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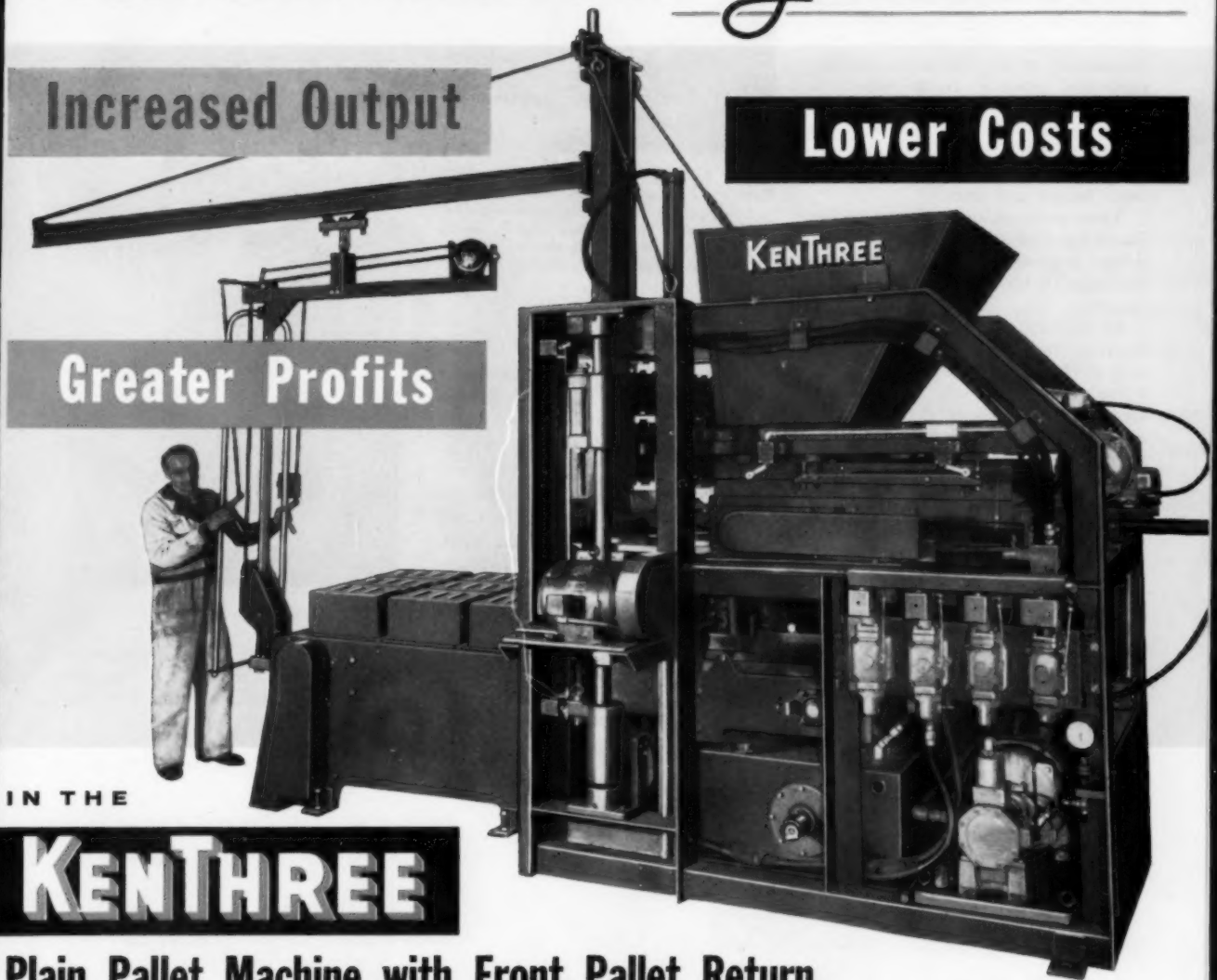

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Plain Pallet Machine with Front Pallet Return

KENTHREE with front pallet return is an example of modern engineering in which the factor of human fallibility is entirely eliminated.

Electric driven hydraulic members permit extreme simplification with a marked reduction in operation and upkeep costs.

The amount of material, the time of agitation and vibration, the size of the block, the forward movement of finished blocks are all controlled electronically and hydraulically.

The KENTHREE automatically delivers three 8 inch blocks or equivalent of accurate dimension and uniform density each cycle with any aggregate.

The offbearer picks up two pallets of finished block from the automatic front pallet return and simultaneously by using a magnetic spade, drops two empty pallets into the machine, one of which moves into position at each cycle.

This advanced designing and operation gives new remarkable results with which you should be familiar.

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N. M. Newmark, C. P. Siess Receive C.R.S.I. Award For Outstanding Research

The 1956 Award of the Concrete Reinforcing Steel Institute was made in recognition of the joint activities of Dr. N. M. Newmark and Dr. C. P. Siess in the field of reinforced concrete research. Their work in Talbot Laboratory at the University of Illinois has ranged from extensive studies since 1936 on concrete floor slabs for bridges and buildings to recent research on the static and dynamic behavior of reinforced concrete beams and slabs.

Their research on highway bridge floors has had a significant effect on design practice in the United States, Australia, Africa, and the Fiji Islands.

Dr. Newmark holds B.S. and M.S. degrees from Rutgers University, and a Ph.D. from the University of Illinois. He holds the J. James R. Croes Medal of the American Society of Civil Engineers (1945) and the President's Certificate of Merit, 1948.

Dr. Siess received his B.S. degree from Louisiana State University, and his M.S. and Ph.D. from the University of Illinois. In 1949 Dr. Siess received the American Concrete Institute Wason Medal.

Dr. C. P. Siess (left) receiving the 1956 Concrete Reinforcing Steel Institute Award in behalf of Dr. N. M. Newmark and himself. Professor H. J. Gilkey (right), award committee chairman, made the presentation at the 32nd annual C.R.S.I. meeting.

General Concrete Products Company of Van Nuys, Calif., announces the future establishment of a new concrete block manufacturing plant at Pomona, Calif. According to E. P. Ripley, president, construction will start soon. Slumpstone, Terracrete, and Flagcrete, products of the company previously made at Van Nuys, will be manufactured at the new plant.

Staff Appointments of W. A. Loewer, W. J. Blaha Announced by N.C.M.A.

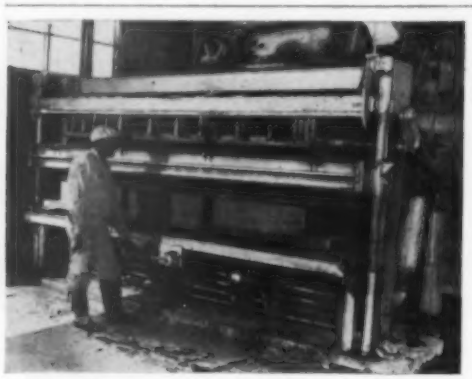
Two appointments to the staff of the National Concrete Masonry Association, Chicago, have been announced by E. W. Dienhart, executive secretary.

William A. Loewer has been appointed to the engineering department as an office and field engineer. Mr. Loewer's duties will include writing technical literature and conducting field investigations.

W. A. Loewer

William J. Blaha has been named publicity assistant to W. P. Markert, director of promotion. In his new capacity, Mr. Blaha will prepare publicity material for both internal and external publications.

W. J. Blaha



PreCaster in operation at Reading Concrete Products Inc. Reading, Ohio

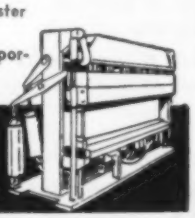
1000' of lintels daily

● Reading Concrete Products says that a few years ago they hesitated to take orders for precast items like lintels, fence posts, highway guard rail posts etc., as their production by hand methods was very limited and their costs high.

● All this has been changed by their *PreCaster*. They now produce those items on a production basis with cost comparable to other concrete items they manufacture. They produce lintels on the *PreCaster* at a rate of 800 to 1000 feet per day . . . color and texture comparing favorably to their block.

● They write: "now you can realize why we consider our PreCaster purchase a very wise investment.

● Write today for PreCaster's new catalog detailing seven profit opportunities. PreCaster Inc., 5217 Beech Street, Cincinnati 17, Ohio.



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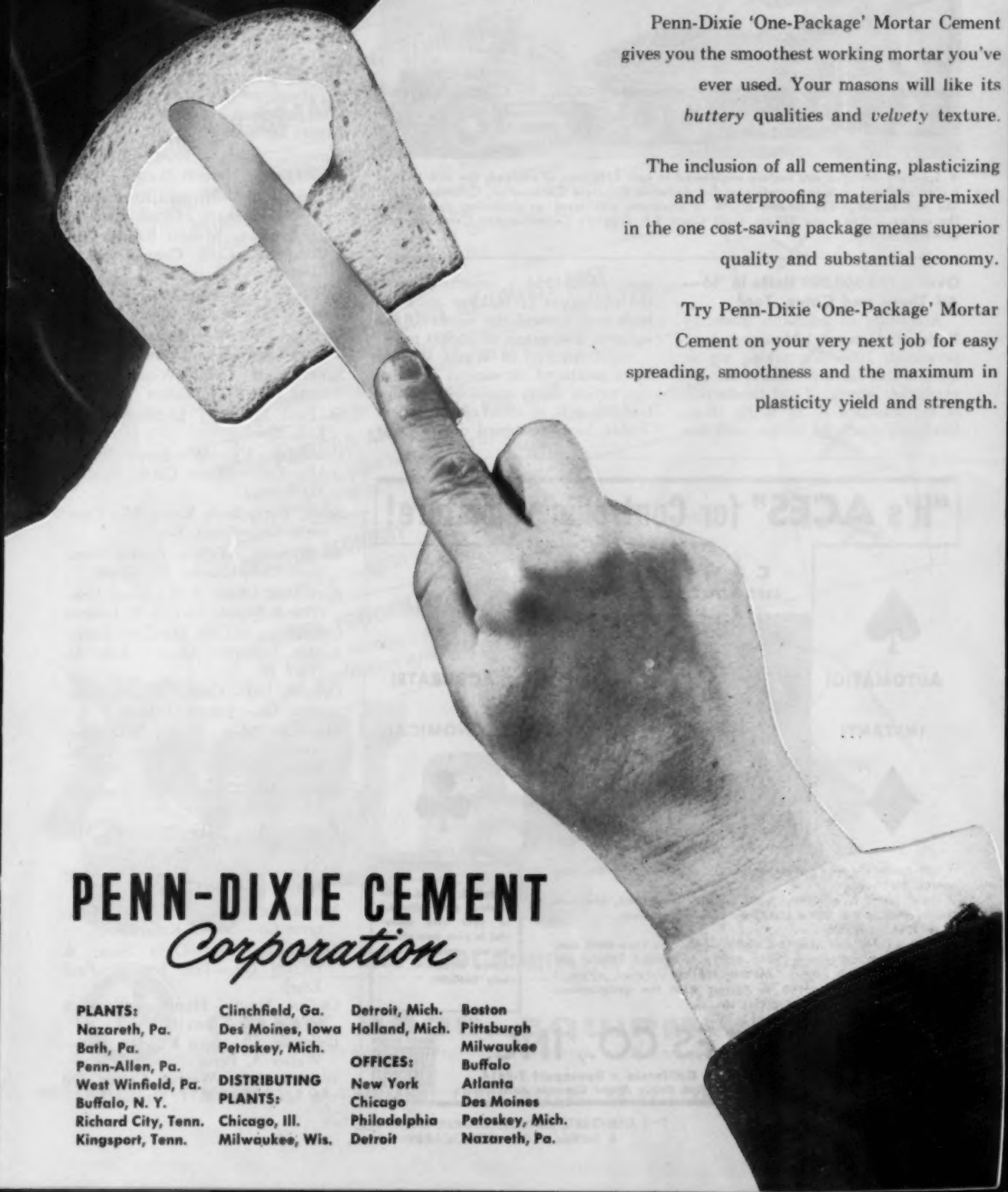
PENN-DIXIE
CEMENT

SPREADS like butter

Penn-Dixie 'One-Package' Mortar Cement gives you the smoothest working mortar you've ever used. Your masons will like its *buttery* qualities and *velvety* texture.

The inclusion of all cementing, plasticizing and waterproofing materials pre-mixed in the one cost-saving package means superior quality and substantial economy.

Try Penn-Dixie 'One-Package' Mortar Cement on your very next job for easy spreading, smoothness and the maximum in plasticity yield and strength.



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Nazareth, Pa.

• Specially designed and factory engineered to haul 23¾ tons of payload, this new tractor-trailer combination is in operation at the Anderson Concrete Corporation, Columbus, Ohio. The Reo Model A-633 tandem tractor is equipped with many weight-saving components. The engine is Reo's new 220-hp. Gold Coast V-8. Liggett's Columbus Reo Company, Inc., delivered the unit.

Over 2,700,000,000 Units in '56—All These and Color, Too!

According to estimates made by National Concrete Masonry Assn. personnel, 1956 is stacking up as quite a year for the industry this organization serves. Total production of the standard 8- by 8- by 16-in. block will reach 2.7 billion units this year, say N.C.M.A. experts. This is the equivalent of building an 18-ft. high wall around the world at the equator, a distance of 24,900 miles!

Until the end of World War II units produced in various parts of the nation were available to home builders only in their natural color. Today, block is turned out in every shade and hue imaginable. Among the more unusual shades now being marketed are "Eye Ease Green," "Peruvian Ochre," "English Derby," Venetian Red," and "Tusk Ivory." For those who like their colors attuned to a time of day, there are "Dawn Blue," "Sunlite Yellow," "Dusk Gray," and "Lamp Black."

Many New Ready-Mix Plants Reported Across the Nation

The following new ready-mixed-concrete plants are now operating, or about to go into production. Plant locations and firm names and owners are given:

Morenci, Mich. — Porter Lumber Company—Herbert Porter

Nevada, Idaho—Nevada Ready-Mix —Glen Hankins, Morton Hess

Aurora, Mo. — Monett Ready Mix Concrete — Cecil Cannady, Ray Blevins

La Crosse, Wis.—La Crescent Ready Mix Concrete Co.—Jerry Ebner

Renton, Wash.—Stoneway Sand & Gravel Co.—Lou Dowell

Santa Anna, Calif.—Western Concrete Co.—Roy Walton

St. Paul, Minn.—J. L. Shiely Co.—J. L. Shiely

Lexington, Ky.—Winchester Ready Mix Co. — James Clark, Stanley Meers

Sealy, Tex.—Sealy Ready Mix Concrete Co.—Frank Koy

South Lyon, Mich. — Hornet Concrete Co.—Charles W. Sinelli

Barberton, Ohio—J. P. Loomis Concrete & Supply Co.—J. P. Loomis

Columbia, Mo. — Mo-Con Ready Mix Concrete Corp. — Lon C. Ware Jr.

Orleans, Ind.—Orange County Concrete Co.—Joseph Tolbert

Meridian, Miss.—Ready Mix Concrete Co. — J. L. Harris, C. M. Bailey

Sparks, Nev.—Ready-Mix Concrete Co.—F. R. Smith

Fordyce, Ark. — Tri-Co Ready Mix Co.—W. A. Moore

El Dorado, Kans.—Ready-Mix Concrete Co.—Bill Higgens

Milwaukee, Wis. — Kolinski Concrete Co.—M. C. Kolinski

Hannibal, Ohio—Ohio Sand & Gravel Co.—Ted Bowers, Paul Emch

Ogden, Utah — Hunsaker Sand & Gravel Co.—Ken Burbank

Belleville, Ill.—Bien & Peter, Inc.—Walter A. Peter

Warren, Ark.—Warren Cotton Oil & Mfg. Co.—E. F. Paulus Jr.

"It's ACES" for Controlling Moisture!

C & W Improved New
ELECTRONIC MOISTURE METER

AUTOMATIC!

INSTANT!

ACCURATE!

ECONOMICAL!

IF you operate a ready mix concrete plant you *have* a moisture control problem.
IF your plant is equipped with a C&W Electronic Moisture Meter, you do *not have* a moisture control problem.
IT IS THAT SIMPLE!
There is a C&W unit near you, and someone you know owns one. Satisfaction guaranteed or your money refunded. Special discounts to multiple buyers. Meters will be installed within 3 weeks of receipt of order, no matter what the geographical location. Send orders or inquiries to

Installed, tested, calibrated and adjusted to your own material in your own plant, by our engineers, anywhere in the U. S.—only $669.00.

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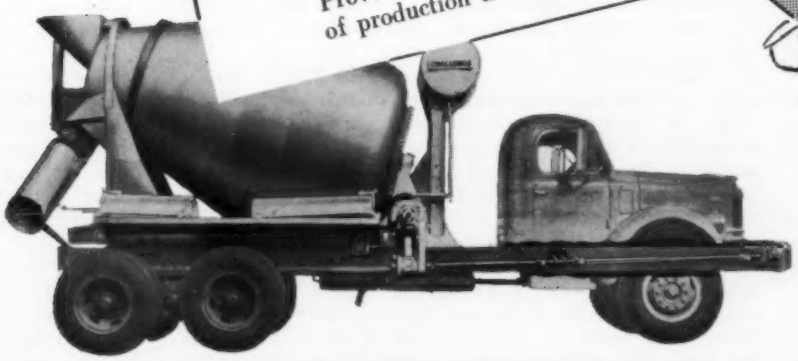
VOTE
THE STRAIGHT "ETO"* TICKET
...TO GREATER PROFIT

CHALLENGE "Pacemaker" Truck Mixer with *ENGINE-TAKE-OFF DRIVE	X
ELIMINATES MIXER ENGINE Challenge "ETO" Drive principle eliminates the need for a mixer engine by taking the power to operate the mixer at full rated capacity, direct from the front of the truck engine. Power is transmitted to the mixer by a simple, straight, automotive type drive line.	X
OUTSTANDING PERFORMANCE AT LOWEST COST Simple to install, operate and maintain, the "ETO" assures outstanding performance at lowest cost.	X
MORE PAYLOAD AND PROFIT PER UNIT Less weight, plus better distribution of weight for greater payload gives more profit per unit.	X
GREATER ECONOMY Saves up to $450 in fuel alone per mixer annually.	X
PROVED PERFORMANCE Proved economy and dependability by more than 5 years of production and service on operations just like yours.	X



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WORLD-WIDE DISTRIBUTORS FOR CHALLENGE TRUCK MIXERS...VALUE STANDARD OF THE INDUSTRY

R/Ready Mix

By Harry F. Thomson

Automation Improves Batching

A CONCRETE operation consists essentially of three steps, namely, batching, mixing, and delivery. Simple as each of these steps appears, it is interesting to consider what changes in methods are taking place in the ready-mix industry over a period of time. It has been said there is nothing really "new" in an established industry, that the changes are refinements of details of operations. However, in recent years there may be noted important improvements in equipment for certain phases of concrete production, all directed toward the goals of either better control of the concrete furnished or of better service to the industry's customers.

An important advance has been the expanding application of automation to weighing in commercial plants. Two types of automatic batching can be distinguished, namely the "fully-automatic" in which the entire cycle of batching each material in sequence proceeds after a single button is punched; and the "semi-automatic" in which the weighing of each material is actuated by a separate button, but then proceeds without further manual attention.

A fully-automatic operation approaches the ideal of weighing all materials in a predetermined order in the minimum of time. Provision can be made to repeat this sequence of weighings of fixed quantities as many times as desired. Such an operation has been required for many years on large hydraulic or other mass structures by the Corps of Engineers and the Bureau of Reclamation. On such projects the objective is to produce concrete having the required characteristics as rapidly as possible. A device is also required to record the quantity and the time of weighing and discharging each material.

Such elaboration of batching equipment is relatively expensive, and although it is justified in projects requiring large, mass production, it is hardly justified in a commercial concrete plant except under unusual conditions of large-capacity operations. There have been only a limited number of such installations in ready-mix plants. A consideration not to be overlooked is that, in order to realize the economy of fast batching which is offered by a fully-automatic system, adequate truck equipment must be available at the plant to haul away the concrete at the increased rate of production.

Several mechanical schemes for automatic operation have been offered. One which has been available for some years and which has been used on a number of major government jobs, provides for a large number of previously designed batches, any one of which can be produced by punching the appropriate button. However, if a mix is desired which is not among those previously set up—and this is likely to occur in a commercial plant—there may be some delay in setting the dials for the respective materials.

Another scheme applies to the weighing mechanism used in business machines actuated by punched cards. In this case the quantity of each material for the desired batch is punched in a card by an accessory machine; the card is inserted in the batching machine, and the respective weighings are made automatically. Successive batches will be the same as long as a given card is inserted in the machine. If a different design or quantity is desired, another card must be punched and inserted. The maintenance of such a complicated unit to assure accurate performance may present a problem. In a somewhat simpler electronic unit the weights of materials for each mix are set by dials, a single button is punched, and the batching proceeds automatically.

The semi-automatic type of batching is probably suitable for a larger number of ready-mix plants, as the cost is much lower than the fully-automatic and the equipment is less complicated. As mentioned above, the semi-automatic operation requires the operator to punch a button to start the weighing of each material; the measurement of each then proceeds automatically for the desired weight setting. The speed of batching depends largely on the alertness of the operator in starting each weighing with the minimum interval after the preceding weighing is completed. This operation can also be equipped for tape recording of the timing and amount of each weighing.

The handling of cement—since it is the most costly ingredient in a batch—deserves special attention in either fully-automatic or semi-automatic batching. In order to improve accuracy of weighing and minimize over-runs, it is desirable to slow down the flow briefly before the end-point. If the cement drops from a feeder or screw conveyor into the weigh-hopper, a two-speed motor can be used, connected to change to the slower speed shortly before the desired weight is reached. If the weigh-hopper is charged from an overhead bin, the cut-off should be partially closed shortly before the end is reached. In any case, the completion of the weighing should be by a trickle-flow.

A possible source of error in measurement of a full-hopper batch, as compared to a small batch, lies in the difference in the height of the column of falling material between the point of discharge and the level of material in the weigh-batcher. The difference in the length of this column as between, say a 6-cu. yd. batch and a 1-cu. yd. batch, may be 2 ft. or more. It is the weight of material actually in the batcher which actuates the scale and stops the flow. If there is a large proportion of small batches, this fact, unless compensated for, may account for a considerable over-run of material in a period of time.

Even if automatic weighing is not used for all materials, it may be justified for the cement alone, because it permits greater accuracy than manual operation. An accessory which might be used with either manual or automatic weighing is a printing attachment to record the actual quantity of each weighing. If these recorded weights are analyzed by comparing them with the weights called for in the respective batches, the accuracy of the batch-

Right to Left
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President
WALTER NETH
Sales Manager
OTTO NETH
Plant Superintendent
PAUL KLEMENS
Asst. Sales Manager

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FASTER PARTS SERVICE. Because Columbia's plants in Vancouver and Mattoon, Illinois, are strategically located near air and rail centers, regular and emergency parts can be shipped immediately to any part of the United States.

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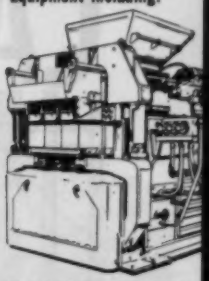
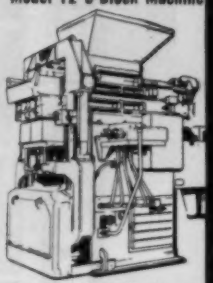
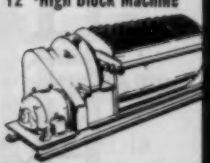


Model 12 3-Block Machine



12"-High Block Machine



Batch Mixers, 12 to 81 cu.

Pallet Cleaners and Oilers

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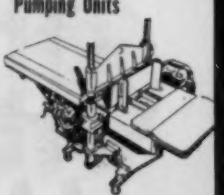

Automatic Block Splitter

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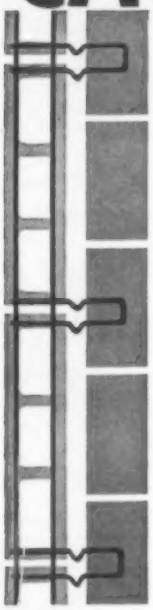
CAVITY WALL data sheet



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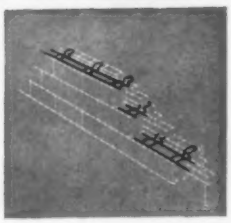
This all flush welded masonry reinforcing relieves horizontal stresses in the back-up wall and ties it firmly to the exterior wall in one operation! Adds lateral strength. Minimizes mortar shrinkage and settlement cracks. Moisture drip U-BAR on 16" centers prevents moisture conduction. Available in 12' lengths of all 3/16" wire. (9 U-BARS per 12' pc.)



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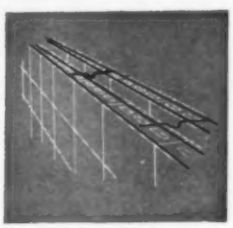
All products available in following finishes: Brite basic siderods and galvanized cross ties. All mill galvanized wire galvanized after fabrication.

CAVITY-LOK *SENIOR*..*

A combination of four lateral heavy steel rods, joined by flush welded cross bars with a positive action moisture drip. With CAVITY-LOK Senior you get the strength of two reinforced masonry walls in one. Available in 10' lengths with cavity ties on 16" centers. All 3/16" wire. (8 ties per 10' pc.) Get all the facts on CAVITY-LOK Senior today!



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ing may be verified and errors may be located. Such an attachment may be of value in checking inventory, especially with regard to the fact that cement is the most expensive item handled.

A feature of any batching which is desirable but difficult to accomplish without loss of time is a positive identification of a given batch being discharged into a given truck for delivery to a given job. Such identification, in terms acceptable to a critical customer, may be of great value in case the quantity of certain loads of concrete is questioned. One approach has been to stamp on the tape or printed record of weights the number of the dray-ticket under which the batch is to be delivered. But unless great care is taken to synchronize the ticket numbers and the number imprinted on the tape throughout each day's run, confusion may follow, and the record becomes valueless to prove what material was actually delivered in given loads.

It is also desirable that the addition of admixes be measured automatically. If the admix itself is a liquid—or if it is received dry, so that it can be dissolved in water or held in suspension—measurement of the desired quantity by volume is commonly used. Throwing a quantity of dry material into a batch with a scoop is inaccurate, and may lead to a considerable overcharge. For instance, an excess of air-entraining agent may cause an increase in air content, which may reduce the strength of the concrete seriously. Several admix manufacturers have developed special equipment for the automatic measurement of their material, which they may make available to customers on a favorable basis to induce continued use of their product.

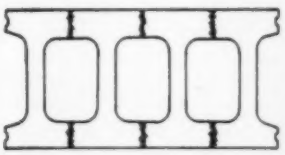
With any method of measuring materials for a batch, whether fully-automatic, semi-automatic, or manual, it is fundamental to know the moisture in the aggregates, especially the sand, as the basis for making the corresponding adjustment in the quantity of water to be added. The determination of moisture has been termed a necessary "housekeeping chore" in the intelligent operation of a ready-mix plant. Accordingly, any method of determining moisture in less time than the conventional drying method attracts attention quickly.

In recent years several devices have been offered for obtaining moisture based on measuring the flow of electric current between two

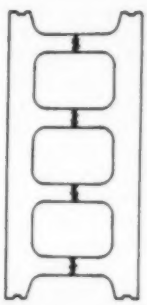
...and Warehouse at Mattoon, Illinois.
British Columbia.

UPT

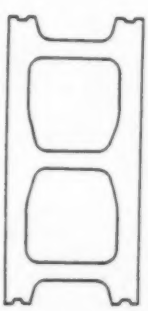
Evolution of the PERFECT BLOCK



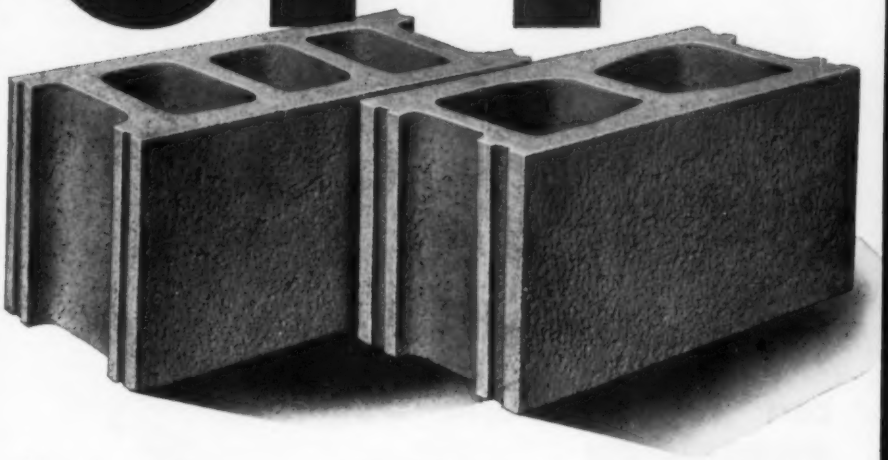
1924 — Besser introduced the Plain Pallet Stripper Tamper. Core plate marks were visible on the top face of each block.



1936 — Besser turned the block around, thereby moving the core plate marks to the center of the web. This was a great improvement.



1955 — Besser swung the stripper shoes UNDER the core plates, thereby eliminating ALL core plate marks on the block.



Now! Besser Gives You UPT— a Block with 100% PRESSED TOP

The Besser policy of continuous improvement is again illustrated in the block with Uni-Pressed Top. This revolutionary new feature incorporates swinging stripper shoes which create a 100% PRESSED TOP. All six sides of the block now have improved texture.

How is this accomplished? Very easily and very effectively. The stripper shoes swing under the raised core plates to form a direct contact with the other stripper shoes. In effect, each pair of shoes becomes ONE and presses the entire area of block surface. The higher division plates perfect edges and corners by pressing more material at these points.

FLOOR AND ROOF PLANK — The UPT feature is ideal for producing floor and roof plank because grinding of contacting surfaces is reduced to a minimum.

SOFFIT BLOCK — The UPT feature eliminates the core plate marks. Saves labor previously spent in preparing block for use. Greatly improves appearance of exposed ceilings.

PLAIN END OR CORNER BLOCK — With UPT, the core plate mark is now completely eliminated on the end of block. Perfects corners of buildings and ends of walls.

Investigate UPT for your plant. Get facts from your Besser representative, or write:

BESSER VIBRAPAC — the fully automatic concrete block machine. Produces high quality masonry units, of any desired texture and density, at the lowest possible cost.

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electrodes immersed in the sand being batched. There is nothing new in this approach; it has been tried by many engineers in the past, with variations in details. Two usual difficulties may cause irregularities; one is the varying compaction of the sand in the area between the electrodes, and the second is the possible change in conductivity due to a change in impurities in the water on the surface of the sand particles.

Another possible difficulty might be a large variation in the grading of the sand, with consequent change in the number of particles between the electrodes. Locating the electrodes in the sand bin and in the weigh-batcher has been tried. Calibration of current readings with known moisture content at a given plant has been suggested as a method of insuring reliable readings under average conditions at that plant. Some of the equipment offered has been equipped with attractive dials and tapes which convey a sense of reliability. However, a concrete producer might want to try out an installation in his own plant to compare it with the conventional drying method, to satisfy himself of the accuracy.

Another method of measuring moisture which has become available in recent years is based on the pressure developed by the acetylene gas generated when a sample of damp sand is mixed with ordinary calcium carbide. The instrument usually furnished is conveniently small, so that it can be held in one's hand; it incorporates a pressure gauge which is calibrated to read the percent of moisture in a sample of given weight. The method itself is good, but as the sample of sand is small, the result may not be indicative for a large quantity of sand.

Possibly one of the fastest and generally most satisfactory methods of determining moisture in sand is the so-called "displacement method". When a given (weighed) sample of moist sand of known specific gravity is immersed in water in a cup of known volume, the net weight of the water and the sample in the cup gives a basis for computing the free moisture in the original sample. Several years ago there was placed on the market a table-size scale with a specially calibrated dial for making this determination. The test could be performed in about one minute. For some years this scale has not been available as a separate unit; it has been furnished only as an accessory to a patented scale arrangement which incorporated a method of automatically adjusting the water added to a batch by the percentage of moisture determined by the accessory scale. If such a calibrated scale again becomes available as a separate unit, it may be of interest to many purchasers who want a quick method for moisture determination.

Editor's Note—A companion article discussing some recent developments in measuring workability, in testing equipment, and in the use of industrial radio will appear in Mr. Thomson's column in an early issue.

J. R. Carlgren, president of the Quartzite Stone Company, Lincoln, Kans., manufacturer of concrete pipe and concrete products, recently announced the opening of a branch office and plant in Great Bend, Kans. Henry Menkemeyer, formerly county engineer, will be sales engineer at this plant, and Perry Peine, who was city manager in Great Bend before joining Quartzite, will be manager of the new office.

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PULVERIZED LIMESTONE
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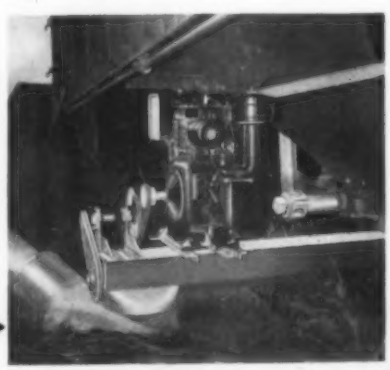
PHOSPHATE
ASPHALT FILLER
ROOFING GRANULES

The ANDREWS Portable Conveyor has the versatile abilities to handle a large variety of free flowing uniform granular materials. Also available in permanent models without wheels. With the P-51 attachment (see below, right) its scope is virtually unlimited.

ANDREWS P-51
Portable Overtrack Conveyor

Teams with the ANDREWS Portable and Permanent Tubular Conveyor to perform double-duty at Cement, Ready Mix, Concrete Block and similar plants unloading covered hopper cars. No pit has to be dug under the track with the ANDREWS P-51 eliminating the usual water hazard. A railroad car can be spotted at any point and unloaded at a moments notice.



The P-51 is shown feeding into an ANDREWS Portable Tubular Screw Conveyor.

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Architect's sketch of the completed $10,000,000 Disneyland Hotel project, opposite the entrance to Disneyland, Anaheim, Calif. The hotel is built of special types of concrete masonry units.

Disneyland Hotel

Interesting Effects and Patterns Achieved With New Dimensional Block

DISNEYLAND, known to millions through the medium of television, stands for the new and unusual. It is not surprising, therefore, that many of the structures in this wonderland have been built with new types of concrete masonry. In fact, practically all of the walls are of concrete blocks made in dimensions differing radically from the commonplace.

A typical application of this use is found in the $10,000,000 Disneyland Hotel, built on a 30-acre site directly across from the entrance to Walt Disney's fun and fantasy area. This series of structures, unique in the scope and luxury of the 650 accommodations offered the visiting public, is the most extensive of its type in this country. Aside from these qualities, the particular interest of the concrete masonry industry lies in the way in which the wall units have been utilized to achieve the unusual and distinctive wall decor planned by the architects, Pereira and Luckman, of Los Angeles.

These architects chose concrete blocks as the material with which to execute their ideas because such walls best provide the effect of mass desired to give to the structure the feeling of stability and integrity desired and to complement the otherwise "airiness" of the overall design. Color, texture, and wall pattern were other elements of the modern design which these architects wove into the creation of a new dimension in concrete masonry, combining structural value and decor within a single unit.

A reddish-brown color was created in the block units by the use of a special lightweight aggregate, and the expanses of wall were complemented by applications of redwood trim. To dramatize the natural color of the block and heighten the textural effect, overall sandblasting of the walls was done at the completion of construction. Texture of unusual character was achieved by a particular blending of graded aggregates, emphasizing both smooth and coarse surfaces, skillfully contrasted throughout the work. The basic unit chosen for the wall patterns was a 12-in. high block, 16 in. long, and of 6-, 8-, and 12-in. thicknesses, depending upon structural requirements.

In interior partitions the 12- by 16-in. unit was used to accommo-

The modern note in motel design is shown here—private patios and sundecks for the occupants of the 650-room "dream motel."

date interior room and hall dimensions on a modular length basis without cutting the blocks. Wall patterns were designed to employ a stacked, or "jack-on-jack" bond throughout, with alternate panels of 8- and 12-in. thick blocks for contrasting effect. Light and shadow effects in the patterns were gained by the use of extended columns in the exterior structural walls. Occasionally panels of 12- by 12-in. blocks were used in the exterior walls.

The structures are reinforced throughout the entire project with ¼-in. round vertical steel rods set on 24-in. centers and with two similar reinforcing bars laid horizontally in each fourth course of blocks. This practice is in accord with the local building code requirements in regard to earthquake-proof construction with hollow masonry units. A double bond beam was provided along all roof lines, and under and over all window openings. No control joints or reinforcing other than the above horizontal application were used. The units used tested in excess of 1,500 p.s.i.

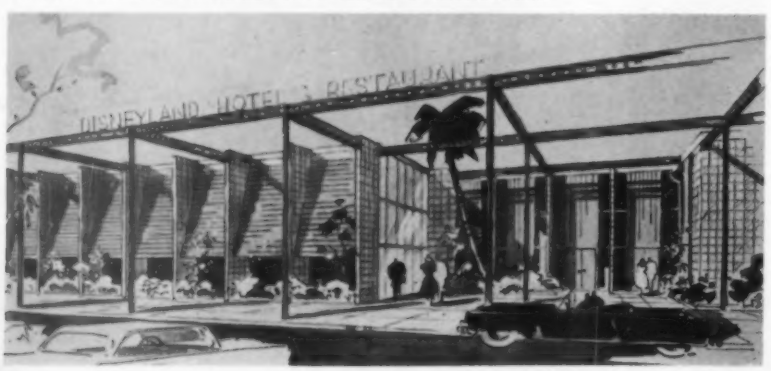
The 12-in. high block unit is only one of several new developments of the Columbia Machine Company, Vancouver, Wash., a manufacturer who has gained an enviable reputation in the block machinery field in a brief ten-year period. The same machine turns out units of 12-, 8-, or 4-in. height, the latter size finding a ready market throughout the industry. The units were made by the North Hollywood Concrete Tile Company, North Hollywood, Calif. This producer worked closely with the architects in the interpretation of their ideas, and produced units of the specified colors, textures, and sizes which were called for in the overall design. Without his understanding co-operation, many of the unusual features of the wall decor would not have been so well accentuated. The mason contractor, M. A. Anderson, contributed a high degree of professional ability in the relatively complicated installation of the many sizes and shapes of block. The "Agg-Lite" cinder aggregates used were supplied by Paul A. Splane Company, Inc., Los Angeles, Calif.

Since the introduction of the Columbia 12-in. high unit, the demand for many special mold shapes has caused mold making to increase greatly at that manufacturer's plant. This fact has necessitated the construction of a new 100- by 200-ft. addition to the main plant in Vancouver, to house the greatly expanded mold department. A new factory and ware house has been opened in Mattoon, Il., where batch mixers, block splitters, and skip hoists will be manufactured to meet the need for more centrally located service facilities. A new $50,000 office wing and a $60,000 service station on its Vancouver property are other expansions recently completed by Columbia.

The total Disneyland Hotel project will involve the use of well over 100,000 of the 12-in. high units to complete the structure. In addition to the basic room units, facilities will be provided for the parking of 700 cars, the construction of four restaurants with combined seating capacities of 1,250 persons, and three cocktail lounges accommodating 500. In all respects, the hotel combines all the luxury of resort accommodations with the conveniences of a motor hotel. There will also be private patios and individual sundecks, to provide living at its best for some of the 10,000,000 or more tourists who are expected to visit adjoining Disneyland Park annually.

One of the parking courts of the motel. These areas include individual stalls for parking the cars of guests.

Below: An architect's detail of the main foyer and entrance to one of the hotel's four restaurants shows the use of extended exterior columns of concrete units.



Clyde Stewart has been appointed production engineer of the Illinois Brick Company, Chicago. He will direct the continuous testing, development, and production of Waylite Block in all IB block operations.

Since 1949 Mr. Stewart has been sales engineer in the Illinois Brick Concrete Products Division; previously he was associated with the Portland Cement Association.

Under Mr. Stewart's supervision, quality control emphasizes compressive strength and moisture content constantly tested with special equipment. It also covers the lighter color, better texture, and accurate dimensioning made possible by high-pressure-steam curing in autoclaves which produce preshrunk block.

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- Handles material wet or dry.
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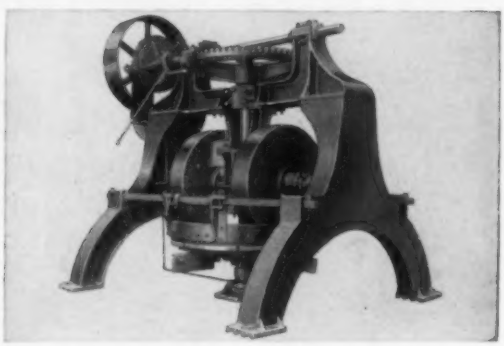

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3-SPEED TRANSMISSION
1½ to 16 drum rpm @ 800 to 2000 engine rpm.

LIGHT WEIGHT
Ruggedly built Jaeger 5½ yd. model weighs only 7200 lbs. Average of 10 other makes, including "lightweights", 7129 lbs.

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16 rpm drum, enlarged loader throat and 25% larger discharge blades set new rates of speed.

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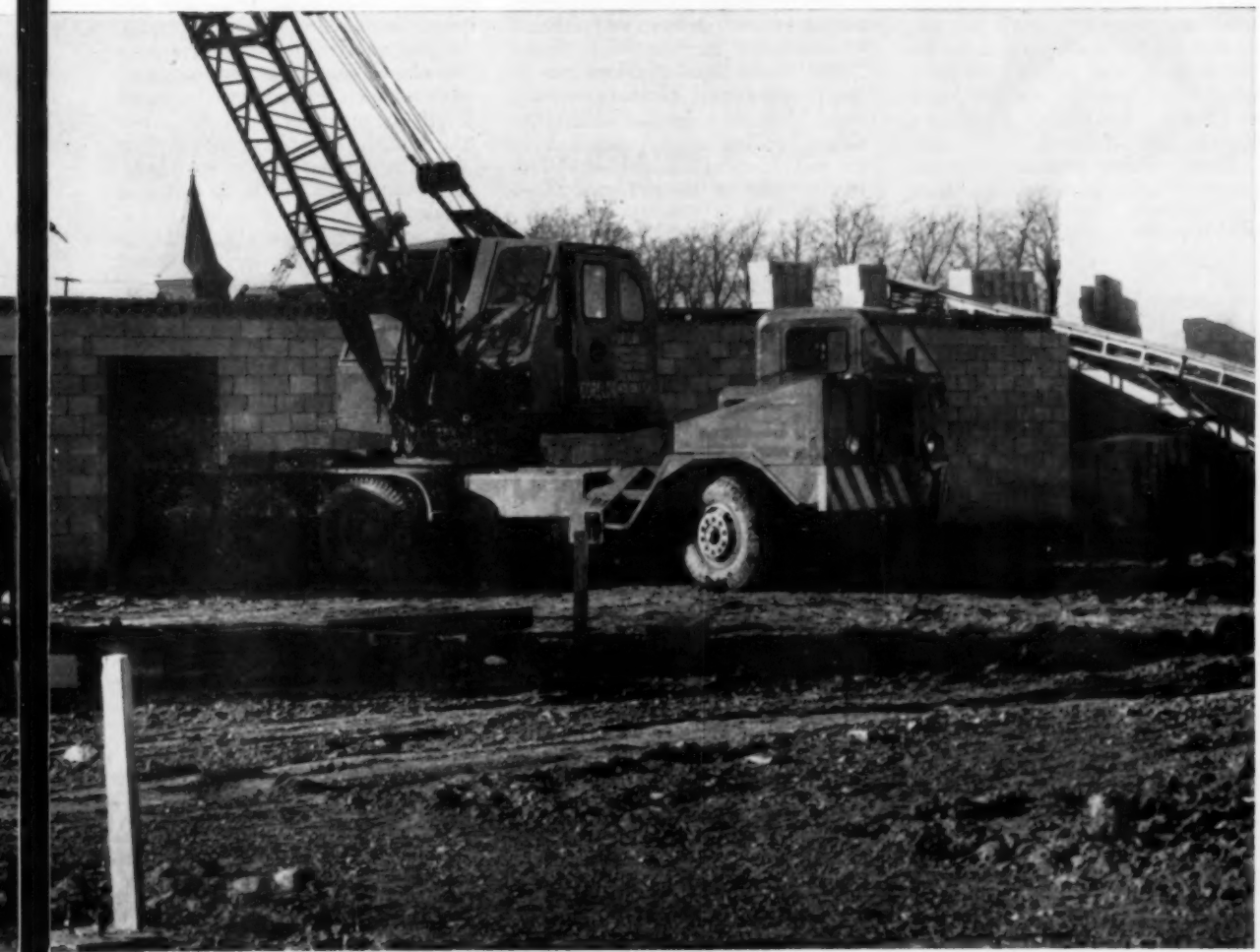

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CONCRETE MIXERS • PAVING MACHINES

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Texas Industries, Inc.—

THEY tell us everything's big in Texas! While we were at times somewhat disposed to doubt this grandiose declaration, we must admit that we were properly impressed as we compiled the facts on Texas Industries, Inc., Dallas.

Open house held on two days (May 18 and 22) in the plant of the Texcrete Company, the Dallas subsidiary facility, pointed the way to an adequate description of the expansions of the parent company, which now operates over 30 plants in Texas, Louisiana, Oklahoma, Kansas, and California.

These plants produce Texcrete masonry units, Holiday Hill stone and Cañon brick, Haydite lightweight aggregates, structural concrete products, ready-mixed concrete, sand and gravel, crushed limestone, Sakcrete dry concrete mixes, glazed tile, concrete pipe, metal culvert, and perlite aggregate. They also distribute an extensive line of additional building materials.

At each open house, architects, engineers, contractors, and officials of interested agencies were introduced to the latest developments in the production of concrete masonry units. Visitors were particularly interested in Texcrete's enlarged physical and chemical laboratories, its production line of three Besser Super Vibrapac block machines, and the four huge electronically-controlled autoclaves recently installed to cure concrete products with high-temperature, high-pressure steam.

Other equipment on display included a completely new delivery fleet, new materials-handling equipment, a new truck maintenance center, an enlarged machine shop and parts warehouse, and new housekeeping equipment used to help keep the plant spotless. The outdoor products storage area has been increased by 10,000 sq. yd. of pavement. Two-thirds of this concrete area was made with Haydite aggregates, for a practical comparison with the wearing qualities of conventional concrete.

The adjacent plants of the Dallas Lightweight Aggregate Company, producing Haydite aggregate, and of the Texcrete Structural Products Company, making prestressed concrete structural members, were also viewed by the visitors. The three plants comprise the Dallas subsidiary operations of Texas Industries, which has boosted the capacity of the company's plants in Texas and Louisiana to more than 25,000,000 concrete units a year. The whole rebuilding and expansion program, now virtually complete, has been actively under way since September, 1955.

In the spring of 1955 company officials decided to install high-pressure-steam curing at its Dallas Texcrete plant. At the same time a

Rear or end view of the four autoclaves, showing the blowdown muffler and stack (left), valves for controlling blowdown (below) and controls for the exhaust fan duct (above).

Below: Texcrete Company's main office and enlarged laboratory at Dallas, showing also the overhead bins and aggregate conveyor belt. This facility was recently rebuilt and expanded.

open house at Dallas features growth of world's largest producer of lightweight aggregates and blocks

large increase in the demand for Holiday Hill stone and brick made it necessary to increase plant production capacity. A study was made to determine whether the two existing Besser block machines should be used to develop this additional production on a permanent two-shift basis, or whether it might be better to install a third machine for the necessary production on a one-shift basis.

The study resulted in a decision to install a third Besser block machine and also the high-pressure-steam curing equipment. Among factors favoring this decision, the principal one was the more effective control and standardization of quality which is possible with a one-shift operation using three machines. In order to operate the third machine, it was necessary to install a complete set of additional overhead bins, together with undertrack conveyor elevators and the auxiliary equipment required to handle the bin installations.

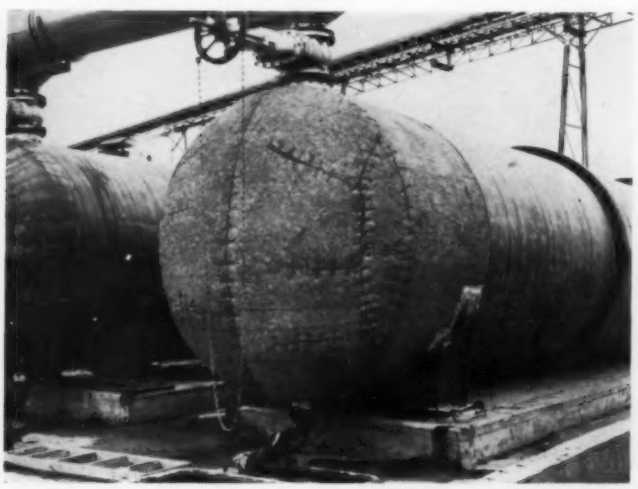
The new bin was needed to provide bulk storage of the puzzolanic material used in high-pressure-steam cured block and a second cement bin, so that white cement could be handled through the batching and mixing equipment in bulk. This bin eliminates the expensive handling of large amounts of white cement in paper bags. In addition, the bin has compartments for various grades of Haydite and for different grades of the limestone aggregates used for Holiday Hill stone and brick. Further, the new bins made necessary the installation of a double traveling weigh batcher, to permit the three 50-cu. ft. Besser mixers to be served from any of the aggregate or bulk cement bins.

AUTOCLAVING EQUIPMENT

Texcrete's high-pressure-steam curing system consists of four identical autoclaves of a type which will be standard for all of the company's block plants in the future. Each autoclave is 106 in. in inside diameter and 112 ft. long from seam to seam, not including the quick-opening door section at the loading end and the closed head at the opposite end.

Specially designed contour racks have been adopted as standard for all company plants producing concrete units. Each rack carries 34 pallets holding 102 8-in. equivalent units, set 7 courses high. This type of rack was adopted because studies showed it is possible to cure more block per inch of autoclave diameter with a contour rack than with either a 72- or 108-block standard rack. For example, the 72-block standard rack previously used required 97-in. diameter autoclaves. By increasing the diameter to 104 in., a gain of 30 blocks was achieved. On the other hand, the 108-block standard rack would have required autoclaves of 120-in. diameter. An increase of 16 in. in autoclave diameter would have achieved a gain of only 6 blocks per rack. The final 106-in. diameter —including the 2-in. extra allowance—was used to permit the company later on, if desired, to autoclave 12-in. high units efficiently.

Each autoclave is equipped with a quick-opening door, designed and fabricated by Kramer Engineering Company, Leavenworth, Kans. This



Construction view of rear end of one of the autoclaves, showing the installation of the insulation material, sewn with wire. All the curing equipment will later be housed.

The main valve for entry of steam into the autoclave is located at the side of the cylinder. All piping is insulated with 2-in. thick glass fiber of 2-lb.-per-sq.-ft. density.

door was selected because it requires the simple, square-type gasket used in bolted door construction. This type of gasket is more economical and has a longer life than some of the more complicated molded rubber gaskets. The door is opened and closed by an air motor running on 90 p.s.i. of air from the company's regular compressed air distribution lines.

The following data on the need for a high degree of insulation on the exterior surfaces of the autoclaves was provided by Cedric Willson, chief engineer of Texas Industries. Mr. Willson stated that design calculations were based on a radiation loss of 0.20 B.t.u.'s per hour, per sq. ft., per deg. F. Since the plant's actual steam requirements have been less than the theoretical calculated amount, it is believed that radiation loss is less than the above figure, reflecting a high degree of insulation value.

Texcrete officials selected 2-in. glass fiber of 2-lb.-per-sq.-ft. density, a product called "Ultralite", provided by Gustin-Bacon Manufacturing Company, Kansas City, Mo. The selection was made after a careful check of five or six autoclave installations in various sections of the country, which were insulated with other materials. Most of these other installations used a much more costly and complicated insulation than the one Texcrete selected.

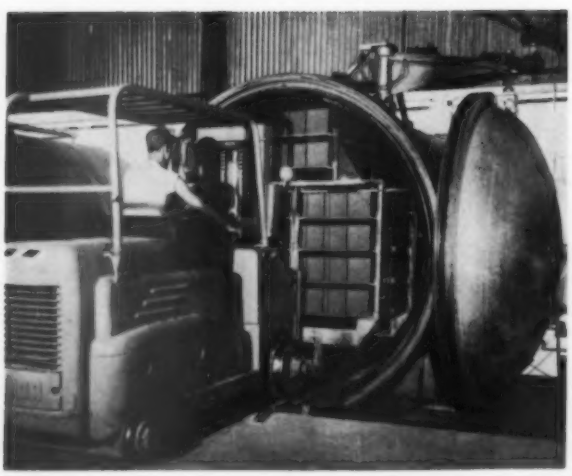
Company officials believe that they selected weatherproof and efficient insulation at a much lower cost than any other plan or system they have seen. They believe that the insulation is durable and will provide satisfactory service for many years. The cost of the complete job, including the application of two coats of liquid Neoprene, was approximately 90 cents per sq. ft. That the company officials are pleased with the insulation job done is evidenced by the fact that they are going to use the same material, installed by the same contractor, Leonard Nelson, for insulating the autoclaves now being set up at Texcrete plants in Corpus Christi, Tex., and at Shreveport and Alexandria, La. Several of the accompanying pictures show the method of installing this insulation around and at the ends of the autoclaves. In installing the insulation at the end of the cylinder the glass fiber was sewed into place with wire, attesting to the strength of the fabric. As the temperature on the interior surface of the autoclave shell is approximately 355 deg. F. during at least five hours of curing, the thermal conductivity of the material composing the insulation blanket must of necessity be low, to avoid costly heat loss through the shell by radiation.

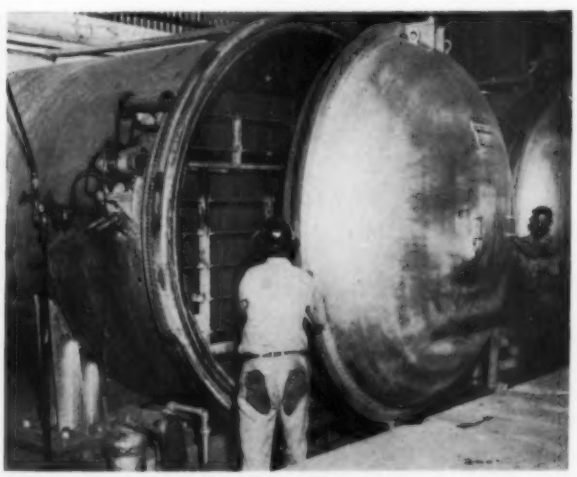
Mr. Willson further declared that the purpose of autoclaving units is to produce high-early strength in the concrete, to furnish drier units which are subject to minimum subsequent volume change in the wall, to procure lighter color in the units, and to achieve greater uniformity and sta-

Left: The large ventilating fan which exhausts the steam-laden air from the autoclaves as soon as the doors are opened, to permit unloading.

Below, left: Loading one of the autoclaves with a fork-lift truck. This passes over a steel bridge which is removed by lift truck when loading has been completed.

Below, right: The quick-opening door on the autoclaves has a simple, square-type gasket. The doors are operated by an air motor running on 90 p.s.i. (left), from the plant's regular air supply.





bility. He noted that the compressive strength of autoclaved units at *one day* is equal to that of units not so cured at *28 days,* and that this high-early strength remains in the unit. Moisture content at one day is below normal air humidity, while subsequent volume change from wetting to drying is at least 50 percent less than in conventionally-cured units.

Explaining the chemical changes occurring in autoclaved units, Mr. Willson said that during the autoclave curing cycle, the lime, silica, and alumina in the cement and aggregates, subjected to high-pressure, high-temperature steam, combine to form hydrated silicates having a completely different crystalline structure. Extensive laboratory tests show that this crystalline form does not expand or contract from subsequent wetting or drying as much as does the crystalline structure developed by ordinary low-pressure steam curing. Because of this important characteristic, autoclaved units represent concrete products at their best.

Block cubing has been mechanized by the use of four air hoists to transfer blocks from the autoclave racks to a conveyor belt (foreground). This method permits close inspection, and reduces cubing cost by 25 percent.

STEAM GENERATING EQUIPMENT

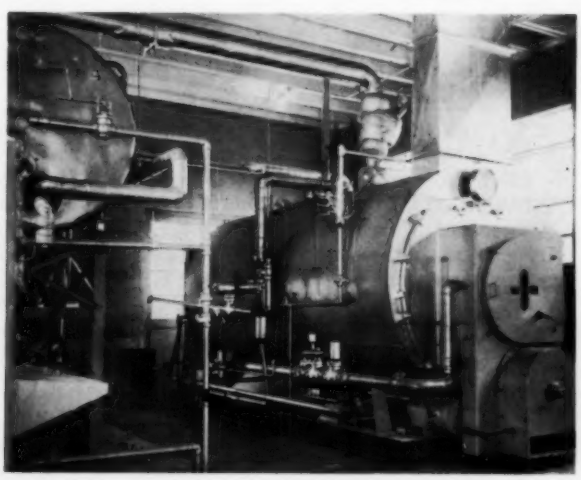
The boiler supplying steam to the Texcrete autoclaves is a 150-p.s.i. Continental boiler. Although the company has standardized on boilers which have a nominal rating of 400 hp., the Continental boiler will actually produce 480 hp. on a continuous basis of operation. It has a highly efficient burner for natural gas, used in all Texas plants, and is fully automatic, in that the burner adjusts itself in accordance with the steam demand at any point in the curing period.

One problem of selecting a boiler for autoclave service arises from the fact that the steam load varies over a very wide range. When one or two autoclaves are in the build-up cycle, the steam demand is large, approaching the full capacity of the boiler. On the other hand, when four autoclaves are under pressure and in the holding period, the steam load is small. The only steam input required is to compensate for the heat lost by radiation off the shell of the autoclaves. At that time the boiler may not be pulling more than 15 to 20 percent of its total capacity. Thus it is necessary to use a boiler which will operate at reasonable efficiency at 20 percent of its capacity load and still perform well at 100 percent of its rated demand. Texcrete engineers believe that the packaged boiler installation chosen was the best answer to these requirements.

The balance of their steam generating equipment is more or less conventional. A standard feed-water heating setup feeds water into the boiler at approximately 210 deg. F. This is important in an autoclave installation because air-laden steam, with a high percentage of oxygen, is extremely corrosive. Such steam would seriously damage the inside

The 150-p.s.i. automatic boiler producing 480 hp. on a continuous basis, by having the natural gas burner adjust itself to the steam demand, which varies widely over one cycle of curing.

Two of the four holding rooms, showing the type of contour rack used, which holds 102 8-in. equivalent blocks. Each room can handle 3,200 units. Low-pressure steam keeps the block in condition.



If you're not in the book *you're a man without*

. . . . . a country
. . . . . a state
. . . . . a county
. . . . . a town
. . . . . a party
. . . . . a street
. . . . . a school
. . . . . a *vote*

Look at all the things you can lose, if you're not a registered voter.

If you're not in the book, you lock yourself out of the elections. The polls are closed to you. You can't vote on streets, or schools, councilman or mayor (not to mention congressman, senator or president). You don't even have the right to *complain* about your government and the way things are run!

But more than that, you cut yourself apart from your neighbor next door, your friends at the shop, your fellow members in union or club.

You lose the right to look that boy of yours in the eye when he wants to know if you're doing your part.

And you lose the self-respect that comes from knowing you can walk into the polls on Election Day—the one place in the world where all free men are really equal. Isn't it too much to risk for the little time that registering takes?

Get your name in the book
—and do it now!

Is your name in the book?

"RCA RADIO REDUCED OUR OVERTIME 20-30% PER MONTH"

(Above) Mr. Clarence Goetz, Vice-President, Clifton Concrete & Supply Co. and (below) one of the radio-equipped Clifton trucks.

—*Reports* **CLARENCE GOETZ**
Clifton Concrete & Supply Co.
Cleveland, Ohio

"It's the greatest thing that has happened to the industry since the advent of the high-dump mixer truck! RCA Radio has reduced our overtime anywhere from 20 to 30 per cent per month. We've made extra profits by being able to close our plant earlier at night."

And he continues:

★ Greater volume of production is possible. Ten trucks, radio-equipped, are equal to 11 trucks.

★ Efficiency in dispatching trucks makes entire operation more efficient. Drivers are supervised at all times, reducing unnecessary trips and delays.

★ Drivers like 2-Way Radio. It relieves them of responsibility—they get answers to questions immediately without having to stop to telephone.

★ RCA 2-Way Radio assures much better service. It not only makes money for us—it makes money for our customers.

Why are the leaders choosing RCA 2-way Radio?

Most of them say they are impressed by RCA's fine service organization and the years of RCA leadership in radio and electronics. Look for these marks of quality: Superior crystals, tubes and microphones for clearer talking, longer life . . . heavy gauge steel case for rugged service . . . color-coded tuning for simplest maintenance . . . expert service by RCA Service Company to assure peak performance.

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of the autoclave shell, and would pit and damage the racks and pallets on which the blocks are placed. This means faster depreciation of equipment and the possibility of unsightly stains on blocks, resulting in more "seconds" than normal.

Texcrete's equipment incorporates a somewhat larger and more complicated water-softening system than would usually be necessary, because the quality of Dallas water varies greatly from time to time. During periods of rainfall, the system receives high-quality boiler water. At other times, when the city is using a large volume of mineral-laden Red River water, the difference is immediately apparent.

CURING PROCEDURE

One autoclave, fully loaded with 34 racks, each holding 102 units, handles 3,468 8-in. equivalent blocks. Two-cycle-per-day operation provides a daily capacity of 6,935 blocks per autoclave. Thus, the use of four autoclaves means a daily plant capacity of 27,744 units. On a one-shift operation, the morning production from the three machines goes directly into the autoclaves, and a curing cycle is begun as soon as the autoclaves are filled. The afternoon production of the machines is diverted into the holding rooms, since all autoclaves are then filled and under pressure. Three new holding rooms have a capacity of 3,200 blocks each, or a total of 9,600 units. Steam is fed into these holding rooms to keep the blocks damp and in good condition for the autoclave curing later on.

When the autoclave curing cycle is complete, the autoclaves are "blown down" as quickly as possible. Blow-down requires about 20 minutes. The doors are opened, and large ventilating fans pull outside air through the cylinders, so that the fork-lift truck drivers can begin unloading the cured blocks immediately. The blocks in the holding rooms are used to reload the autoclaves for this second period. Normally, the unloading-reloading operation requires approximately an hour, using two fork-lift trucks.

RESEARCH LABORATORY

During the year-long rebuilding program, the central research laboratory of Texas Industries has grown to an area of 2,200 sq. ft., or more than double its previous size. This laboratory is operated for the entire concrete division of the company. A laboratory of this size and scope of operation is not considered practical for a one-plant producer.

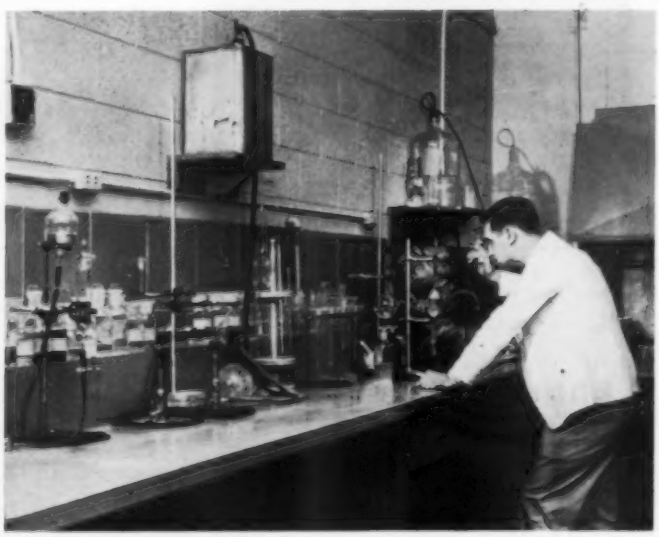
In addition to facilities previously described, and earlier equipment owned before the expansion, the laboratory now has considerable other new equipment. The staff can now perform any physical or chemical tests required on routine plant production; it can conduct research on and development of Haydite blocks, Holiday Hill stone or brick, dense aggregates, precast or structural elements, or on other phases of the concrete business in which the company is not yet engaged.

The following are some of the pieces of equipment in the laboratory: an air permeability fineness apparatus to measure the fineness of cements and finely ground or divided siliceous materials such as silica flour, limestone flour, stack dust from the company's Haydite plants, and other materials used in autoclaved concrete; a small concrete mixer used for trial batches in the design of concrete mixes—either all-Haydite, or Haydite combined with other ingredients for structural or roof-fill applications; a mortar mixer for perlite aggregate concretes, and for mixing foam and perlite; a foam generator used to produce a mechanical foam for cellular concrete or combined cellular and lightweight aggregate concretes; a small electric mixer employed in experiments in formulation of colored concretes, and also for performing standard A.S.T.M. tests of cement and mortars.

The laboratory's 300,000-lb. testing machine has been modified by the installation of a special valve to control the rate of loading. This device permits stress-strain determinations to obtain the elastic properties of concrete which previously were not obtainable without using a much reduced loading rate. In addition to SR-4 strain gauges and an SR-4 strain gauge indicator, the laboratory has obtained two Statham unbonded strain gauges which may be electrically connected in parallel. Attached to opposite sides of a concrete specimen, they are then connected to the SR-4 strain indicator for stress-strain measurements.

The pilot autoclave in the physical section of the laboratory is equipped with a quick-opening door similar to those on the full-size cylinders used for curing blocks.

A view in the central research laboratory. A chemist is running a hydrogen sulphide test on gases from kilns of the Dallas Lightweight Aggregate Company, a subsidiary.



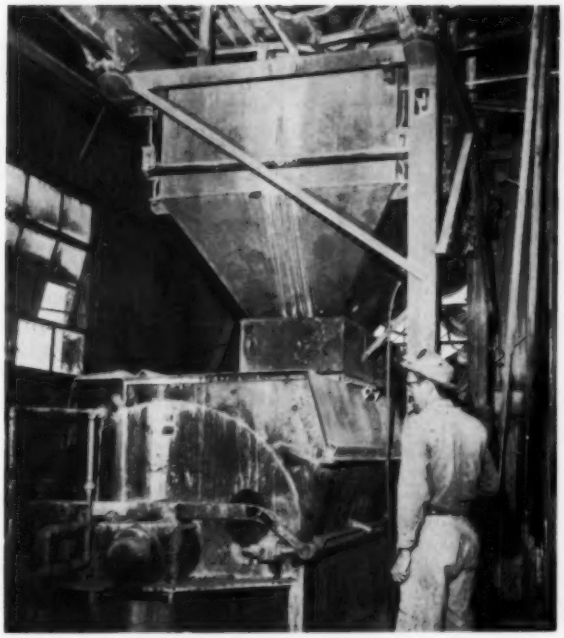
In addition, the laboratory is equipped with a ball mill, used to break down various types of Haydite and other materials into finely divided powders similar in particle size to portland cement. This mill utilizes a rotating drum containing porcelain balls and a charge of the material to be broken down. After milling the charge for different periods in the ball drum, the fineness obtained is determined by the air permeability fineness apparatus. The laboratory's constant-temperature room, in which precise determinations of concrete shrinkage are made, has been completely rebuilt.

The laboratory also houses a fully equipped chemical section. Complete standard analytical facilities, including fine Bausch-Lomb microscopic equipment for petrographic work, enables the staff to run chemical analyses and determine compositions of all pertinent materials.

The physical section includes a pilot block machine, a pilot block concrete mixer, a pilot rotary kiln 24 in. in diameter by 16 ft. long, and a pilot autoclave equipped with the latest type of quick-opening door. The laboratory has a permanent staff of four men and is headed by Rudolph C. Valore.

Mr. Valore joined Texas Industries in November, 1955, as chief of the research and development division, engineering department. He was formerly a cement and concrete specialist with the National Bureau of Standards, Washington, D. C. While he was with that Bureau, he became internationally known for his studies of cellular concrete, research in frost action on concrete, and dynamic tests of materials. In 1954 he was awarded the Wason Medal, highest award of the American Concrete Institute, for the most meritorious technical paper published during the year.

Cedric Willson, who heads all engineering operations, has contributed importantly to the development of the concrete industry over a period of many years. He is chairman of the technical problems committee of the Expanded Shale, Clay and Slate Institute, and chairman of the high-pressure-steam curing committee of N.C.M.A. He has written many technical papers on portland cement and concrete for the American Institute of Mining, Mechanical, and Petroleum Engineers and A.C.I. He was a project consultant on the Yucca Flat, Nev., atomic blast technical tests last year, and recently received the Federal Civil Defense Administration Public Service Award for his contribution to the nation's defense.



The new double traveling weigh batcher and one of the three 50-cu. ft. concrete mixers which it serves from any of the aggregate or bulk cement bins installed above.

Cubing of block at Texcrete has been mechanized to a large degree by employing four Besser air hoists to transfer the blocks from the autoclave racks to a conveyor belt. The use of this belt facilitates the work and permits closer inspection, while reducing cubing time by 25 percent.

Truck maintenance facilities have been modernized in a new building containing the latest equipment for motor tuning and all types of repairs. In this building there is also a warehouse for accessory items sold by Texcrete, such as paint, Wal-Lok wall reinforcing, and white cement. Another section of the building is used for storage of molds. This depot supplies all plants in the Texas Industries system with parts for Besser machines.

James B. Dunn has been appointed to the position of controller of The Marietta Concrete Corporation, Marietta, Ohio. He will supervise accounting procedures for the entire company, including the main office at Marietta and branch plants at Nashville, Tenn., Charlotte, N. C., Baltimore, Md., and Jamestown, N. Y.

Hugh Richmond

Hugh Richmond, Hyster Company, has been promoted to the sales engineering department of Hyster's Eastern Industrial Truck Division at Danville, Ill., according to Philip Hill, vice-president in charge of sales.

Mr. Richmond has been with the engineering department at Hyster's home offices in Portland for over four years. He is a graduate-engineer of the University of Portland and also attended Oregon State College.

Robert S. Harris

Officials of the Dallas Lightweight Aggregate Company, a subsidiary of Texas Industries, Inc., have named Robert S. Harris technical service representative for the north Texas area, to assist architects and engineers with information on latest design development for haydite lightweight concrete.

Mr. Harris, a registered architect and engineer, has been with a firm of consulting engineers, and more recently was associated with Texcrete Structural Products Company, Dallas. He is a graduate of the University of Texas and for two years instructed in architecture and engineering at the University.

Prestressed Concrete Institute

CO-OPERATION IS KEYNOTE OF ANNUAL MEETING AT HOLLYWOOD, FLA.

Another ON THE SPOT Report

ONE of the youngest, but certainly the most progressive of all the national organizations promoting the uses of concrete, the Prestressed Concrete Institute, held its second annual convention at the Hollywood Beach Hotel, Hollywood, Fla., on May 16 to 18. An attendance of well over 350 persons—from the most eminent engineers to the most obscure student—coming from 32 states and 5 foreign countries, attested to the widespread interest which this intriguing subject has engendered throughout the industry over the last five years. Most of those who attended the meeting came to learn something, for the real experts in this newest of techniques are unfortunately in the minority. One thought was outstanding. It was the spirit of co-operation which the experts exhibited throughout the three-day meeting, in making public the "facts of life" of prestressing for the benefit of all.

The panel on materials and techniques included R. M. DuBois (chairman), H. H. Godfrey, Ernest Gruenwald, A. H. Gustafferro, R. O. Kasten, Nathan Levine ,and Alvin Schwab.

Participating in the panel on production and inspection were P. J. Verna Jr. (chairman), A. C. Bruce, H. A. Price, E. K. Rice, J. C. Rundlett, and D. A. Sawyer.

A program was presented which covered all phases of prestressing. On the morning of the first day, two panel discussions were held simultaneously. One dealt with materials and techniques, the other with production and inspection. That afternoon two more split discussions were on the program, the first of these on application, the other on specifications. These two discussions were followed by a panel discussion on design.

While it may be true that the primary interest of everyone present fell into one of these various subtopics, considerable criticism was heard as to the desirability of having simultaneous discussion on important subjects. The specific topics discussed are, in our opinion, so interwoven in prestressing, that much would be gained by attending each of the four meetings; however, this was impossible under the arrangement followed. It is felt that in future meetings of this nature some plan might be evolved in the programming of panel discussions which would better afford the opportunity for everyone to attend all the sessions of interest to him, even though such an arrangement might add another day to the length of the convention.

The intermediate day of the meeting was very effectively used for trips *via* bus to various casting yards and structures in the vicinity of Hollywood, in which either production or installation of several types of prestressed structural concrete elements was in progress. That evening several films dealing with various phases of production or installation or with the use of equipment, were shown to large groups in attendance. On the last day of the convention seven technical papers were presented by authorities in their specific fields of prestressing; and at the banquet held that evening Walter L. Lowry Jr., head of the Civil Engineering Department, Clemson College, Clemson, S. C., was the guest speaker.

Materials and Techniques R. M. DuBois, Freyssinet Company, New York, was the chairman of the panel which discussed materials and techniques. Panel members included H. J. Godfrey, J. A. Roebling's Sons, Trenton, N. J.; Ernst Gruenwald, Lone Star Cement Company, New York; A. H. Gustafferro, Portland Cement Association, Chicago, Ill.; R. O. Kasten, Union Wire Rope Corporation, Kansas City, Mo.; Nathan Levine, Elgood Materials Corp., Brooklyn, N. Y.; and Alvin Schwab, U. S. Steel Corporation, New York.

Mr. Gruenweld spoke briefly on cements and the effects of using a high-strength concrete in prestressed products. He enumerated the five classes of portland cement, but said that Types I, II, and III are the types usually used in prestressing. Most of the differences in these types of cement, he said, are differences in the rate of hardening of the cement paste, and he pointed out that much good can be obtained from the use of a high-early-strength cement in most prestressing requiring quick reuse of forms.

Mr. Gruenwald said that with Type I, with accelerating heating, a strength of 4,000 p.s.i. can be obtained within 18 to 48 hours. The same strength can be had in Type III in 12 hours, without accelerated heating. Low slump, for minimum shrinkage, is the rule in all prestressed concrete. Mr. Gruenewald described tests made by his company on concrete in which 4¾ and 5.7 gal. of water per sack of Type III cement had been incorporated into the mix, giving, respectively, 4,000 p.s.i. and 2,300 p.s.i. in 24 hours. Both these mixes gave over 5,000 p.s.i. at 28 days' age. With Type III cement, low water content, and heat curing, he obtained regular runs of strength of 3,500 to 4,500 p.s.i. in 18 hours, and in these cases the 28-day strength was not lowered.

Mr. Gustafferro based his remarks on the preliminary report, *Recommended Practice for Prestressed Concrete*, prepared by the A.C.I.-A.S.C.E. Joint Committee 323. He spoke of several points which appear to be controversial. These included the following:

Amount of slump of the concrete —should this be low (1- or 2-in.), to keep the shrinkage low?

Strength—should this be specified or left open?

Placing concrete in level lifts—this has aroused much discussion among adherents and dissenters.

Concrete temperatures—Mr. Gustafferro feels these should not go as high as 90 deg. F.

Curing — this item should be spelled out in detail for every project.

Admixtures—this is probably the most explosive issue, but one conclusion was agreed upon, namely, to bar the use of calcium chloride because of the possibility of its inducing corrosion in the prestressing steel.

Mr. Gustafferro urged all members to submit their suggestions to the committee on these and other points.

Mr. Godfrey showed a series of slides on the manufacture of high-strength steel wire or rods for use in prestressed concrete. He described the processes of hot rolling of billets into rods; heat treating or "patenting"; cold-drawing the rod to proper sizes, which changes the granular structure into a cold drawn fibrous structure; and stress-relieving the wire, to obtain high elastic properties and improve straightness. He stated that factors which influence the quality of the wire after shipment may be corrosion, mechanical damage, and heat. He showed the importance of the effect of heat, and warned that welders should be kept as far away from high-tensile strand as possible.

Mr. Kasten showed a number of slides on the construction of the longest vehicular bridge in the world, nearing completion across Lake Pontchartrain, La. In this 24-mile monumental structure, 56-ft. long beams 33 ft. in width are pre-tensioned, prestressed with ⅜-in. high-strength strand, and supported on 54-in. diameter post-tensioned pilings. More than 4,000 miles of this strand was used, the greatest amount ever incorporated into any structure built. (The description of this bridge was presented in the CONCRETE MANUFACTURER, June, 1956, page 198).

Mr. Schwab defined modulus of elasticity as a numerical relationship between stress and strain, and illus-

Three members of the panel on specifications (left to right) are Professors Lin and Ekberg, and Thor Germundsson. Other members of this panel were R. W. Kluge (chairman), W. E. Dean, Curzon Dobell, and H. J. Godfrey.

H. H. Edwards (chairman), Ross Bryan, R. C. Dorland, R. M. DuBois, E. J. Ruble, J. C. Rundlett, and Eugene Smith were members of the panel on application.

trated his remarks on this subject with slides showing various stress-strain curves. He discussed at great length the methods of making such curves for high-tensile strand, emphasizing that the factor which seems to have a marked influence on the determination of modulus of elasticity and stress-strain is the gauge length in which elongations are measured. He said that his company has found 100-ft. specimens yield more consistent results than the 10-, 20-, 24-, 50- or 100-in. gauge lengths used commercially.

Nathan Levine discussed setting up a double-Tee casting bed, and also a universal casting course for the production of beams, piles, and other types which cannot be made on the double-Tee bed. In connection with this, he described single-point, double-point, and quadruple-point jacking systems, illustrating these with a series of slides. He warned that differences between elongation of the strand and the hydraulic pressure must be resolved, or at least the differences should be analyzed in view of these two factors and the jack calibration.

Production and Inspection The concurrent panel discussion, on which P. J. Verna Jr., Concrete Materials Company, Charlotte, N. C., acted as chairman, was on production and inspection. Panel members included the following: H. A. Price, Basalt Rock Company, Napa, Calif.; E. K. Rice, Western Concrete Structures Company, Los Angeles, Calif.; Werner Rosch, Lewis Manufacturing Company, Miami, Fla.; J. C. Rundlett, Department of Public Works, Boston, Mass.; and D. A. Sawyer, University of Florida, Gainesville, Fla.

Mr. Sawyer's topic was the role of the engineering inspector on prestressed concrete jobs. He pointed out that there were two general types of inspection — what the producer does himself to insure that he is getting good quality, and what is done by the engineer to assure that his client is getting a job according to specifications. He listed and described the functions of an inspector on the job. He illustrated the points he made with personal reminiscences from his past experience.

Mr. Price spoke on facilities and equipment. Among the deficiencies often observed in plants which have grown without overall initial planning, he stated that the following deserve attention: property, engineer's talent, testing and research facilities, aggregate and cement storage facilities, batching and mixing equipment, jacking equipment, universal tensioning beds, vibrating equipment, curing facilities, lifting equipment, and transportation equipment. He presented his ideas on each of these requirements of a good operation. Mr. Price suggested that each producer have available for expansion enough strategically located spaces for rail or water shipment, as well as for highway transportation.

J. C. Rundlett in his talk covered dimensional and strength tolerances. In his down-to-earth talk on the relative importance of tolerances, he subscribed to the recommendations of Joint Committee 323, and stated his contention that, "with reasonable care, units manufactured in a plant especially designed for prestressed work, with well-constructed beds, well designed and built forms, by average conscientious plant workmen, will automatically be better controlled and constructed than units made in the field. . . ."

Werner Rosch, who filled in for A. C. Bruce, Shell Industries, Windsor, Ont., Canada, took up the topic of curing in his talk. He said that the usual curing methods in prestressed concrete production are heat, warm water, or steam curing. He feels that the best method of curing is to cover the forms with tarpaulins and blow live steam underneath it. In many yards producers are using heat under the forms and a sprinkler system working on top. Mr. Rosch stated that tests have shown somewhat better performance from steam-cured units than from those which were moisture-cured.

Mr. Rice spoke on safety in production, transportation, and construction, confining his remarks to

Panel members who discussed design were (left to right): Professor Zia, Professor Lin, Thor Germundsson, Eugene Smith, and W. E. Dean.

The new television and radio station of WCKT and WCKR, Miami, Fla., in which twin-tee slabs and I-joists were used roof fill is perlite. Lewis Manufacturing Co., Miami, furnished the prestressed members.

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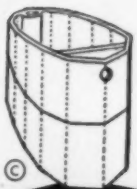

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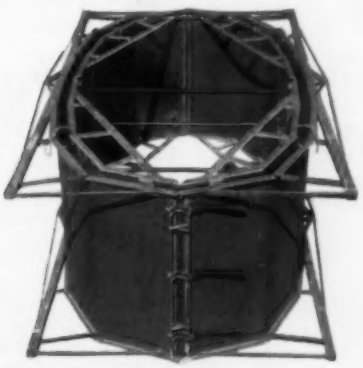

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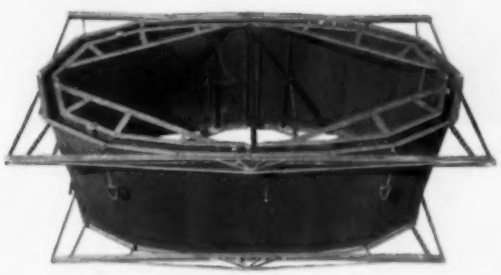

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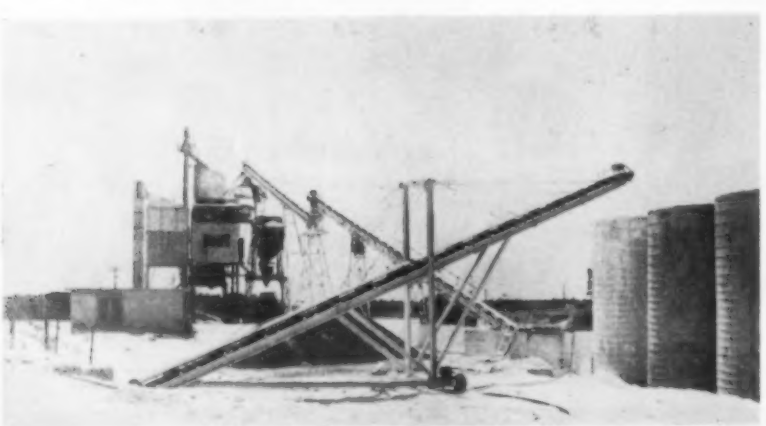
The twin-Tee slab casting bed at the Lewis Manufacturing Company's plant, Miami, Fla., visited by the P.C.I. guests.

The double-Tee casting bed, 430 ft. long, at the plant of R. H. Wright & Son, Deerfield Beach, Fla., said to be the largest prestressed concrete plant in this country.



Ready-mixed-concrete production equipment at the Wright prestressing plant.

the unique hazards presented in the prestressing business, as distinguished from the usual hazards of ordinary concrete construction work. He called attention to the fact that in the prestressing operators are dealing with very large forces, and warned that they should respect those forces in using them. He suggested frequent proof-pulling of the pull rods, to avoid disastrous failures in these.

Wire breakage is another frequent type of trouble, but its danger is lessened with the increasing use of strand reinforcing. Carefully designed pickup points must be used, and the member must be carefully supported during its transit to the job site. Construction safety in handling prestressed concrete members calls for a briefing of the crew on the unusual hazards involved, to avoid disastrous results.

Applications Harry H. Edwards, Leap Concrete, Inc., Lakeland, Fla., was chairman of the panel discussion on applications. Panel members included Ross Bryan, consulting engineer, Nashville, Tenn.; R. M. DuBois, Freyssinet Company, New York; E. J. Ruble, Association of American Railroads, Chicago; J. C. Rundlett, Department of Public Works, Boston, Mass.; Eugene Smith, Freyssinet Company; and R. C. Dorland, Southwest Structural Concrete Corp., San Diego, Calif.

Mr. Dorland briefly described the first use of prestressed concrete in San Diego, in slabs for the construction of a bridge 165 ft. long, with 28-ft. spans. The design permitted either wood or prestressed concrete, the former being bid at $24,900 and the latter at $28,500. The reason for choosing concrete was that prestressed concrete required much lower maintenance charges for painting, fire protection, etc., than the wood structure. This bridge was built with composite sections having 5-in. ribs of 5,000 p.s.i. concrete. In the deck slab 3,000 p.s.i. concrete was used. Loading was H 20 S 16. The structure was erected in 14 hours.

Mr. Rundlett told of use of prestressed concrete in bridges of Massachusetts. He said that most American engineers have concentrated on the design and production of smaller spans, probably with the thought in mind that since this is a production country, to be sold, a product must be competitive; to be competitive, it must be mass-produced; and when

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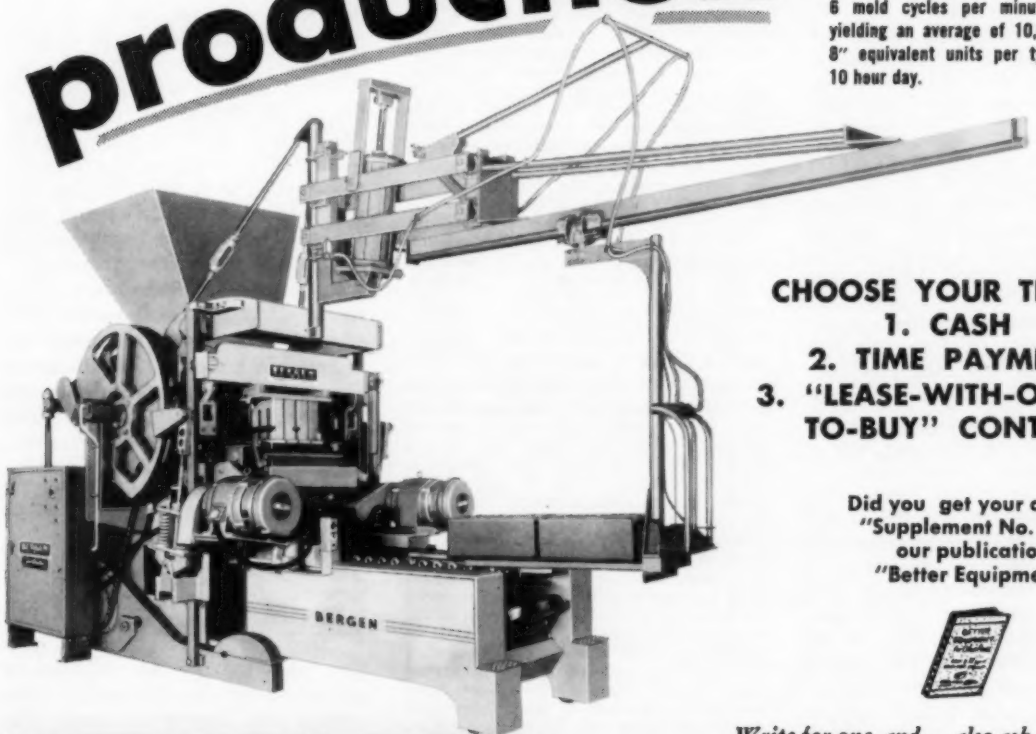

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mass-produced, it must be transportable. He stated that economy predominates in his state, standardization on beams made in plants being mostly the rule because of this factor. He felt that Florida is outstripping the rest of the nation in prestressing, due mainly to the higher cost and shortage of structural steel and to the types of short-span, pile-trestle bridges which are being used in that state.

Eugene Smith gave a brief description of design procedures of the Freyssinet Company in flexure members, mainly for post-tensioning, and told of the various prestressed members on which load tables have been made available. These include the double-Tee slabs for roof and floor construction, the wide flange or modified beams employed as girders, the hollow slab for roadway or sidewalk units on bridges, and the I-beam for girders in medium- or long-span applications. He said that the trends in types of prestressed units constantly change, with one or another taking the lead for specific uses according to the demand as to load, span, etc. He described the use of prestressed units in the construction of Pier 57, in New York, in which floating units and flat jacks were featured.

Ross Bryan, consulting engineer, spoke on architectural applications of prestressed concrete. He deplored the lack of experience the average architect possesses to enable him to design by this method, adding that most of the design of applicable structures have been done by specialists in the field. He feels that is a problem to the architect, especially as it tends to upset his drainage plans.

Mr. Bryan declared that economy of prestressed concrete members is one of the biggest factors which will increase its use in the future, and urged all present to take that factor into design considerations. He said that the necessity of providing for continuity in members must be recognized and suggested several cases where this was done satisfactorily by means of mechanical connections from girders and beams to columns.

Mr. Ruble spoke briefly on railroad bridge applications, stating that there are some 190,000 such bridges in this country, and that replacement of structures is constantly under way. He described in detail the application of prestressed concrete beams for a bridge slab on the Burlington Railroad, a type which in his opinion will be used in many similar applications.

Specifications Specifications for prestressed concrete were treated in a panel discussion, the chairman for this meeting being R. W. Kluge, University of Florida, Gainesville, Fla. Panel members included W. E. Dean, chief bridge engineer, Florida State Road Department, Tallahassee, Fla.; C. E. Eckburg, Lehigh University, Bethlehem, Pa.; Thor Germundsson, Portland Cement Association, Chicago; H. J. Godfrey; and Professor T. Y. Lin, University of California, Berkeley, Calif. Curzon Dobell, Preload Company, New York, a panel member, was unable to be present at this meeting.

Chairman Kluge announced that the panel members would discuss the general topics of materials and allowable stresses, composite construction, and fatigue. Mr. Godfrey presented his talk on specifications for wire strands, first submitting a proposed specification on uncoated 7-wire strand for the consideration of the meeting. The requirements of this strand include the following:

The six outer wires shall have a uniform pitch of not less than 12 nor more than 16 times the nominal diameter of the strand. All strands shall be stress-relieved after forming. They shall be of carbon steel having an analysis in the percentage range of carbon, 0.70 to 0.85; manganese, 0.40 to 0.90; phosphorus, 0.045 maximum; sulphur, 0.050 maximum. Properties of the strand shall conform to the following table:

Diameter in in.	Area in sq. in.	Ultimate Minimum Strength in lb.
1/4	.0356	9,000
5/16	.0578	14,500
3/8	.0799	20,000
7/16	.1089	27,000

The minimum yield strength (0.2 percent offset) shall not be less than 85 percent of specified minimum ultimate strength. Elongation shall not be less than 4 percent in 24 in. The elongation shall be determined as the percent increase in separation between the jaws of the testing machine, from the position after application of the initial load to the position at the initial failure in the test specimen. The separation of the jaws shall be approximately 2 ft., when under an initial load equal to 10 percent of the required minimum breaking strength of the strand. All tension and elongation tests shall be made on lengths of strand which do not contain wire splices. Samples of strand shall be taken from each 100,000 ft. of strand. The manufacturer (of the strand) shall furnish a typical "Load-Elongation Curve" for the size of the strand being furnished. Other tests or curves shall be made at the customer's expense.

Thor Germundsson discussed the historical background and progress of Joint Committee 323, and told of some of its future plans in a brief resume of his talk later in the program. The 80-page preliminary report finally arrived at is only a basis for discussion and comment. This was first presented at the A.C.I. convention in February.

Professor T. Y. Lin discussed allowable stresses, a subject which he declared has become a rather confusing problem. He stated that the two basic requirements, or criteria, are that the structure must behave properly under service conditions, and that it must have the required strength. He declared that stress is not the criterion for proper design, citing several examples to prove this point. He pointed out that if structures cannot be designed by using allowable stresses, the designer can go to the basic requirements of design so that the structure will be strong enough and serve well under service conditions.

Mr. Dean, in discussing composite construction, said that any design specifications will necessarily have to be based on rational design concepts, which are themselves based on the laws of mechanics of materials. He questioned why most of the specifications covering composite construction place great emphasis on developing horizontal shear between the original element and that superimposed, instead of mentioning the vertical uplift which occurs in many cases of failure. His own idea of composite construction is to hold the two elements together vertically; and with a normal amount of roughening of the surfaces, he believes that the resistance to horizontal sliding which can be safely taken is about the value of the bond on reinforcing steel.

Professor Ekberg's topic of discussion was the fatigue of prestressed concrete, a subject, he said, on which specifications make no direct recommendations. He added that there is not much published information on the subject. After reviewing the points in the Bureau of Public Roads Criteria which might affect fatigue determinations, Professor Ekberg made three recommendations: (1) exclusion of the requirement that the computed ultimate moment be greater than twice DL plus LL plus impact for large-span work; (2) consideration of the change in steel stress due to LL; (3) more research work, particularly on the dynamic stress of prestressing tendons.

NOTE: Due to lack of space, reports of panel on design and on technical papers will be furnished in the August issue of THE CONCRETE MANUFACTURER.

Modern Block Making Hampered

By Antiquated Curing Equipment

By WILLIAM J. SHORE
Shore Engineering
New York, N. Y.

ALTHOUGH machinery and equipment used in the manufacture of concrete blocks have been developed to a remarkable degree of efficiency and effectiveness, the block curing kiln is one outstanding example of lack of improvement or progress.

The author wishes to point out in this article how the antiquated kilns, too often seen today, defeat the basic purpose of curing, through improper construction, and to show how curing kilns may be built to effect better curing at lower fuel costs. All facts and other data presented are based on tests, records, and observations carried out on curing systems designed and installed by the author.

Comparing the "high-octane" block equipment with the "horse-and-buggy" curing equipment well describes the relationship existing between modern block-making machinery, lift trucks, automatic unloading, conveying, weighing and batching equipment, and the wasteful and inefficient curing kiln.

Block-making equipment has reached a high degree of efficiency. This feeling is confirmed by the fact that block sell for the same price today as they did some 20 years ago, even though the price of materials and labor going into blocks has more than doubled in the interim. This improvement in machinery and other equipment does not apply to curing kilns. There has been no change in the construction and operation of curing kilns. They are indeed still in the "horse-and-buggy" era.

Steam curing of concrete block has been in use for over 20 years. With steam it is possible to accelerate hydration of the cement and create sufficient strength in the blocks so that they may be moved from the pallets the day after their manufacture. With moist curing only, pallets and racks are usually tied up for about seven days before blocks may be removed and cubed into stockpiles. The steam process alone justifies its cost by reducing the investment in pallets and racks.

Another important advantage in using steam curing — although this has not been fully credited by the industry—is that steam-cured block tend to develop light and pleasing shades of color, such as rich cream shades for the sand-stone-cement concrete units, and a light, attractive blue-gray shade for those made with Haydite or cinders. These lighter and more attractive colors have played a large role in the greatly increased consumer acceptance of blocks for exposed masonry.

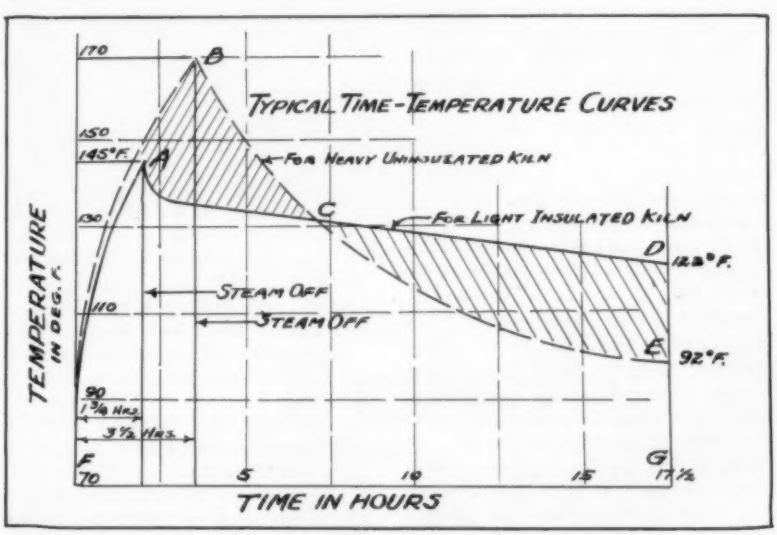
Steam curing must be carefully controlled to be of value in curing block. If steam is applied too rapidly and the temperature of the units rises too high, case hardening occurs, or loss of moisture, and such blocks will be worthless, or at best, will never achieve normal working strength.

In describing briefly the construction of the ordinary curing kiln, it is found that the outside, rear, and dividing walls are usually built of 6- or 8-in. thick concrete block units. Kiln roofs may be of concrete planks, channels, or poured concrete arches, usually 5 or 6 in. in thickness. Floor slabs are usually of monolithic concrete of the same thickness. As to openings, some kilns have one end opening; others have doors at both ends. Door closures range all the way from ordinary tarpaulins, to be rolled up and down, to highly insulated metal-framed doors with a carrier arrangement to permit easy operation. It has been found that in many cases the doors are of much more efficient construction, from the standpoint of insulation, than are the walls, roof, and floor of the kiln.

Usually one or two low-pressure steam boilers, either oil- or gas-fired, or equipped with stokers for coal, are used to produce steam. Steam is usually fed into the front end of kilns and is allowed to flow until proper temperatures are reached within the kiln. The steam is then turned off and the blocks remain in the kilns with the closures in place until some time the next day, when the block are removed and the kiln is again loaded with fresh, green units.

Practically no improvements have been made in curing kilns since 1930, certainly none to keep pace with the improvements effected in the other equipment used in block making. Today's kilns seem to be identical with those constructed in 1930 or prior to that date.

The following reasons appear to account for this disproportionate improvement: (1) There has been



practically no competition to produce a more efficient kiln, since most operators feel that they are capable of building their own kilns, with their own concrete blocks. (2) The relative cost of curing has been considered so low that it is not considered necessary to make improvements in the kilns. (3) Because the custom of copying from others is so well established in the block industry, most mistakes, faults, and other shortcomings in the construction of kilns have been faithfully reproduced, creating a false standard for curing kilns, the effectiveness or efficiency of which has never been challenged.

A great majority of the present-day curing kilns are deficient for one or more of the following reasons: The quantities of steam required to bring the kilns up to proper heat are greater than they need be, because the materials used in the construction of the kilns are far heavier than they need be, and accordingly take more steam to raise the temperature of the materials to the curing point. A longer time is required for kiln temperature to reach its proper point because of the extra heat absorbed by these heavier materials. The combination of a greater amount of steam, kept flowing over a longer period of time, increases steam demand, fuel costs, and initial investment costs, of boiler plant and steam piping systems.

Because the ordinary kiln has little insulating quality, excess loss of heat to the outside requires more steam to maintain the rate of temperature rise; heat loss also retards increase in temperature. Insufficient insulation allows heat to escape, causes a rapid fall of temperature within the kiln, and thus retards or impedes the rate of hydration of the cement and consequent strength of the blocks. This loss of kiln temperature unduly retards the expulsion of water from the cured block when it is removed from the kiln to the outside air.

Tests and temperature recordings on 6 insulated and 16 ordinary kiln installations showed that the fuel consumption in ordinary (uninsulated) kilns per 1,000 standard 8-in. concrete block equivalents, amounts to 20 gal. of oil. In lighter-weight insulated kilns fuel consumption amounted to only 8 gal. of oil. These findings indicate that uninsulated curing kilns of heavy construction requires 2½ times the fuel that lighter-weight insulated kilns require. In terms of cost savings, for every $5,000 spent per year in fuel costs for curing, had the kilns been of lighter-weight materials, and insulated, the cost would have been only $2,000.

For the sake of simplicity, in comparing the heat demands and heat leakages of these two types of kilns—heavy uninsulated, and lightweight insulated—see accompanying summary in which all heat demands and leakages in the former type are stated as 100 percent, and compared with the percentages for these items in the latter classification.

Heat Requirements for Curing Kilns

	Heavy, uninsulated, heated to 170 deg. F.	Light, insulated, heated to 145 deg. F.
Steam required for:		
Blocks, racks and pallets	100%	53.5%
Side and rear walls	"	25
Roof slabs	"	25
Floor slabs	"	75
Steam required to make up heat loss through:		
Side and rear walls	"	10
Roof slabs	"	10
Floor slabs	"	40
Average steam consumption based on test results, actual findings	"	40

A comparison of the above figures confirms closely the 60 percent steam economy effected through the use of lightweight, insulated kilns. In heating up blocks, racks, and pallets to 170 deg. F. in the uninsulated kilns, and to 145 deg. F. in the insulated kilns, only 70 percent of the heat is required in the latter case. When the heat of hydration of the cement is deducted, the amount of heat required in the insulated kiln is 53.5 percent of that required in uninsulated kilns.

Contrary to the general opinion of block makers, ordinary heavyweight concrete units are not good insulators. In heating the side and rear walls, the heat first goes through the inner wall of the block and enters the core section. Air in contact with this warmer surface becomes heated, and accordingly moves upward and around the core, going down on the outer (cooler) surface of the core, creating a moving air current that transfers the heat to the outer wall of the unit through convection. That this is so can be confirmed by placing the hand in contact with this wall, when steam is on in the kiln, and feeling the higher temperature of the surface.

When the block cores are filled with insulation, however, only the inner wall of the block is heated; the passage of the heat is largely stopped by the core insulation. Thus, steam is cut by half, and since temperature in this case is only 145 deg. F., the actual heat demand is only 25 percent of that needed in the uninsulated wall. The loss of heat to the outside wall surface is only 10 percent of the loss which occurs in the uninsulated wall, in which the temperature within the kiln is held at 170 deg. F.

The solid 5-in. concrete roof slab in the uninsulated kiln is exposed to an inner temperature of 170 deg. F. In the case of the insulated kiln, a sandwich plank or slab is used which has only 1½ in. of concrete in its lower section; the remainder is of lightweight insulating concrete of much lower thermal conductance. Thus only one-third of the heat passes through the roof, much of which would escape to the outside if the roof slab were built of ordinary heavy concrete. The inner temperature of the insulated kiln is held at 145 deg. F. Thus, the heat demand in the roof slab is only 25 percent of the demand if the heavy 5-in. concrete is used. Because of the insulation and the lower temperature, only 10 percent as much heat escapes through the insulated roof slab.

The same analogy may be applied to the passage of heat to the ground through the floor slab. In this case, however, the concrete in both instances is identical and of the same thickness; but because the temperature is 145 deg. F. instead of 170 deg. F., the proportion of heat loss through the floor slab of the insulated kiln is only 70 percent of that going through the slab in the other kiln.

When blocks are removed from any kiln they contain about 85 percent moisture. They are left to stand for a matter of an hour or so before they are cubed and placed in stockpiles. During this time the blocks lose this contained and surface moisture, to the extent of about 50 to 55 percent of the original content, depending largely on the temperature of the block when they are removed from the kiln. The higher that temperature is, the higher is the vapor pressure, the force which drives the moisture in the block into the air.

Normally, in the case of uninsulated kilns, blocks come out of such kilns at a temperature of around 92 deg. F., which corresponds to a vapor pressure of .75 p.s.i. In the insulated kiln the blocks come out at a temperature of about 122 deg. F., at which the vapor pressure is 1.75

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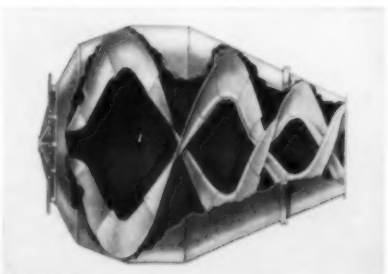

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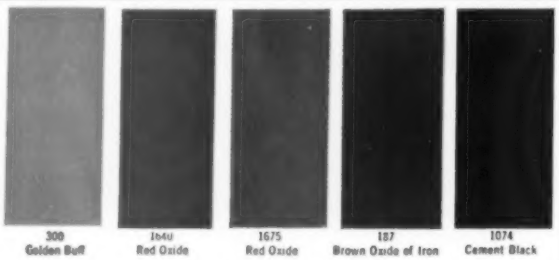

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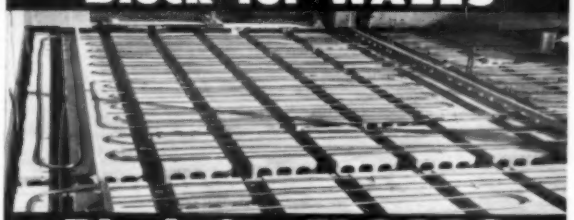

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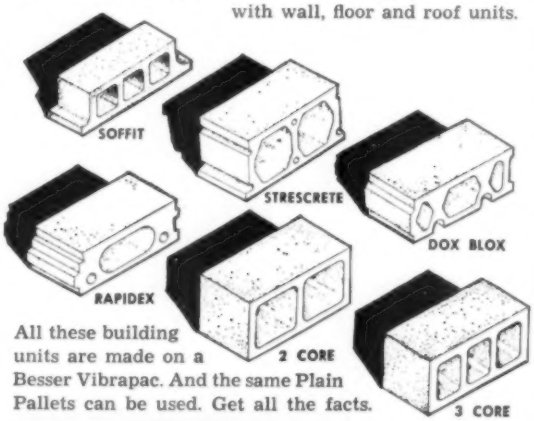

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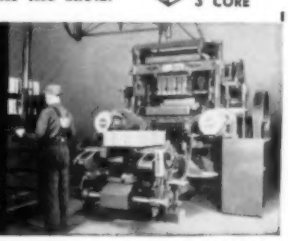


A 8658-½

p.s.i., or approximately 2⅓ times as high. This ratio indicates the relative rate at which moisture leaves the unit, creating a drier condition in the block, a substantial and desirable difference.

In the past most block makers have considered lightweight, insulated kilns or minor importance. The following analysis of time-temperature readings for both types of kilns should prove of real interest to those producers who seek at all times to improve their product and its manufacture. The author has made a recording of each installation of steam curing equipment and has charted the rate at which the temperature in the kiln rises during the heating cycle and the rate at which it falls after steam is shut off. Much can be learned about the efficiency of any kiln installation from a study of these time-temperature recordings.

If the temperature rises steadily and rapidly, maintaining its rise without falling off, there is evidence that the kiln is well insulated. If, after the steam is shut off, the temperature falls very slowly, again this is evidence of good insulation in the kiln. However, if the temperature falls rapidly — especially from the higher reading — we know at once that heat is being lost rapidly. The two curves on the accompanying chart represent time-temperature records of one old-style heavy uninsulated kiln and one new-style lightweight insulated kiln, the former indicated by the broken line, the latter by the solid line.

For the heavy uninsulated kiln, steam flowed into the kiln at the rate of 825 lb. per hour, and for the lightweight insulated kiln, at the rate of 550 lb. per hour. The area enclosed by the points F A C D E G represents the curing effect (temperature times hours) created in the insulated kilns, while the area F A B C E G represents the curing effect in the uninsulated kiln. During the first 6 or 7 hours the curing effect is greater in the uninsulated kiln, and during the last ten hours the curing effect is less. The greater curing is indicated by the area A B C, the lesser curing by the area C D E. If both these triangles were equal in area, the curing effect would be identical. As it happens in this particular case, triangle A B C is somewhat smaller than C D E, and the curing effect for the insulated kiln is therefore somewhat greater. For the present purposes of comparison, we may regard them as equal. All points plotted to create curves are taken from actual temperature chart recordings. Since the chart curves are circular with varying time spaces, they are transferred to rectilinear ordinates, to permit area comparisons.

The temperature curve for the insulated kiln shows a top point of 145 deg. F., and a bottom point of 122 deg. F., or a drop of 23 degrees in 17½ hours — 1.31 degrees per hour. The curve for the uninsulated kiln shows a top point of 170 deg. F., witha low point of 92 degrees, a total drop of 78 degrees in the same time—at the rate of 4.45 degrees per hour. For equal curing effect it is necessary to go to 170 deg. F. in uninsulated kilns, but only to 145 deg. F. in insulated kilns.

As previously stated, to reach 170 deg. F. in 3½ hours, a steam flow of 825 lb. per hour is required. To reach 145 deg. F. in 1¾ hours a flow of 550 lb. per hour is required. Steam used in the uninsulated kiln amounted to 2,880 lb., and in the insulated kiln only 975 lb. Steam required per 8-in. equivalent units in the uninsulated kiln was 2.0 lb., and in the insulated kiln only .68 lb. per unit.

With the small extra cost required for insulated kilns, the most noteworthy advantage is apparently that the temperature need not be raised so high. It seems reasonable that if cement effectiveness can be adversely affected by too rapid a rise in heat and by a final temperature which is too high, the lower heat of 145 deg. F. is better for the blocks than the 170 deg. F. required in old-style kilns. In many instances blocks have been ruined by allowing steam to create too high a temperature. Such blocks, on careful examination, show very fine hair cracks on the top surfaces, indicating the escape passage of water vapor or steam. Such damaged blocks are worthless. Where the rise in temperature is too rapid, an effect called case-hardening occurs, and the blocks subjected to this treatment never achieve the same full strength as moist-cured blocks having proper curing.

A constant and low degree of heat in a moist atmosphere seems to produce highest strength, and it is there fore reasonable to assume that block subjected to the maximum temperature of 145 deg. F. and the minimum of 122 deg. F. should be stronger than blocks within the temperature range of 170 deg. F. and 92 deg. F. Insulated curing kilns make it possible to cure block at these desirable limits.

The chief reasons for high steam economy in insulated kilns would include the following: (1) initial block heating need be carried only up to 145 deg. F. instead of to 170 deg. F.; (2) less weight of construction materials used in the kiln reduces steam demand to heat the interior of the kiln; (3) insulation provided against loss of heat from the inside of the kiln cuts down the steam necessary to replace this heat loss, and most important, inside temperature falls very slowly (slightly over 1 deg. F. per hour); (4) the more nearly constant temperature inside the kiln promotes more thorough curing of block.

Other minor benefits include these: (1) since the temperatures of the block at the time of unloading are higher, the units lose moisture more rapidly; (2) since initial temperatures are lower, possibilities of damage to the block are minimized; and (3) the cost of the required fuel is only 40 percent of that consumed in old-style, uninsulated kilns.

The installation of a lighter-weight, insulated kiln costs no more than one which is not so constructed. For a 6,000-block per day production, the extra cost of building insulated kilns is from $1,000 to $1,500 more. However, this extra cost is entirely offset by the smaller steam boiler required for the lower demand (60 percent less) in the insulated kiln than in one which is not so insulated. This lower cost is the same amount as the cost of insulation.

Comparing operating costs of the two types of kilns, steam demand, fuel consumption and fuel cost are each 60 percent lower. For example, taking the same 6,000-block production per 24 hours (1,500,000 units annually), old-style curing requires 30,000 gal. of oil annually. At 13 cents per gallon, this cost is $3,900. Compared with this, the insulated kiln requires only 12,000 gal. per year, or an annual fuel cost of $1,560, with a consequent saving of $2,340. In ten years this saving amounts to $23,400.

Once block makers realize that fine curing performance and low fuel costs are actual and obtainable, they will probably wish to build only insulated kilns in the future, and that gradually the old-style horse-and-buggy kilns will be eliminated.

Herman A. Abry of New Orleans, La., has received the franchise to manufacture Bondstone, a colored-textured concrete unit originated by Emco Cement Products Company of Pennsylvania. Mr. Abry expects to erect a plant in New Orleans in the near future.

Duplicating Nature . . .

Detail of architectural treatment of Holiday Hill stone in white and off-white shades in a large San Antonio, Tex., home.

A WORTHWHILE merchandising effort which has paid off in handsome dividends — national acceptance of the "new look" in concrete masonry—is the work of Burney and Felder, of San Antonio, Tex. These two creators of architectural beauty by means of split masonry units have virtually bettered Nature's display of color. They have added imaginative texture and pleasing architectural fluidity of line, achieving the new effects with the ordinary tools and equipment of the concrete block industry.

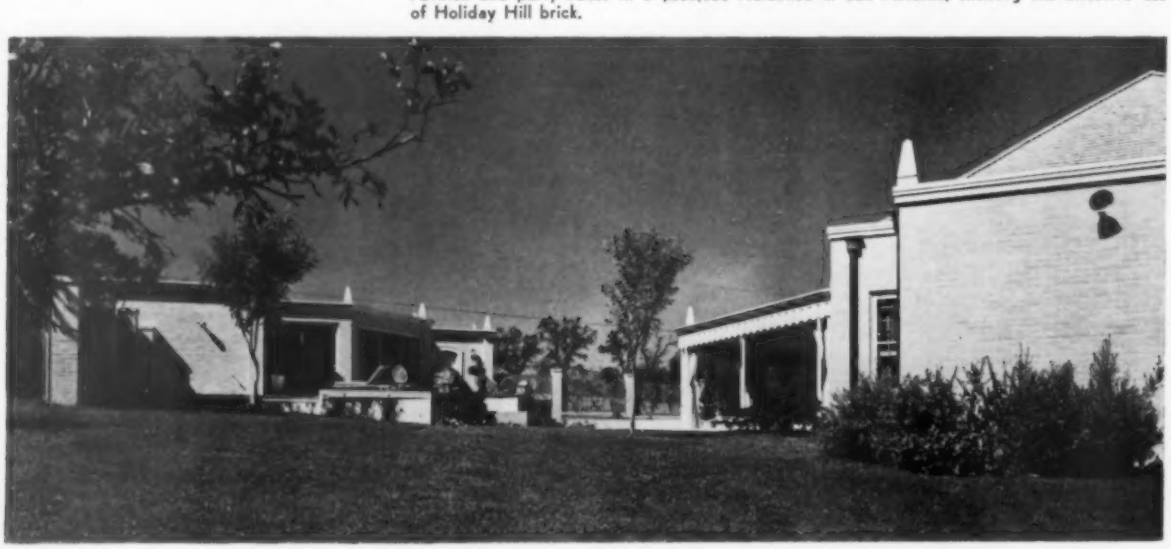
If that industry is to compete successfully in the race for acceptable building-exterior materials, if it is to satisfy the modern demand for something new and exciting in architecture, it must use imagination and ingenuity freely. The day is past for producers who fail to realize that there is much more to a wall than economy, stability, and usefulness as an enclosure. Burney and Felder seem to have gained this realization early in their careers and later combined it with practical merchandising principles. Within the short space of time the company has operated, full color pages of Holiday Hill stone applications have appeared in several national publications serving the architectural and home construction fields.

Many producers of block—under the urgings of the national association—have endeavored at times to add color and texture in small measure to the otherwise plain surface. Usually the color has been in innocuous pastels, and the texture variations were achieved in grading of aggregates. The size of these units was held by tradition to some dimension of the basic 8- by 8- by 16-in. unit. Definitely, these minor changes are not enough in these days of rapid change.

Again, the originators of Holiday Hill stone cast aside traditional fetters and made Nature the color stylist and architect for their product. Appreciating the trend toward the ground-hugging character of the modern house, they patterned the dimensions of their units in accord with this idea, utilizing longer, horizontal lines and rougher, natural effects in texture.

For color designation they called into play imaginative locale-object combinations, such as Riviera Dawn, Miami Coral, Parisian Rose, Orleans Cafe au Lait, Brazilian Cinnamon, California Redwood, Sea Island White, Hawaiian Green, Arizona

Pavilion and party house in a $200,000 residence in San Antonio, showing the effective use of Holiday Hill brick.



Texas firm develops unusual shapes, colors, textures in Holiday Hill split stone

Sage, and a host of others reminiscent of natural colorings. They called their textures Roughewn, Sawn-Textured, and Ranchero. These trade names they protected by registration in the U. S. Patent Office.

They realized from a quality standpoint that the material had to be the highest that could be produced with present-day equipment. They had the Southwest Research Institute, the Rice Institute, and other reputable testing concerns explore the capabilities of their product as to strength, absorption, and permeability. The units met or surpassed national specifications on these qualifications. (Burney and Felder offer the original test reports to those who are interested in this phase of their product.)

It appears that many persons are becoming interested in Holiday Hill stone. While marketing of the product is presently most extensive in the area adjacent to San Antonio, where shipment could be made more easily, the company is granting manufacturing franchises to plants all over the country—and in foreign countries—to make the products. One of the largest producers of blocks, Texas Industries, Inc., Dallas, Tex., has been granted an exclusive franchise to make Holiday Hill stone in many of its 30-odd plants, located in five states. Accompanying pictures show the length to which this producer goes in his new research laboratory, to examine the physical structure of the stone, or to experiment in the formation of colored concrete effects yet to be marketed. Texas Industries will produce Holiday Hill stone in Texas, Oklahoma, and Louisiana.

The best materials that can be found are incorporated in Holiday Hill stone, as it is realized that particular selection of color and gradation of aggregate, correct amounts of cement — both gray and white portland — and of mineral coloring pigments, are of critical importance if quality is to be permanently built into the product. These particular combinations selected were based on the necessity of producing shade variations which would not change. Selections entailed studies of various mineral oxide pigments and aggregates under widely different conditions, to meet both production requirements and exposure to varying degrees of climate. The amount of research work which was done on such examination of materials attests to the thoroughness of the company's endeavor to find the best materials for each use.

The concrete stone is made in solid units on conventional high-production block machines. Basically, these units are either 16 or 24-in. long, the thickness varying from 1 to 6 in. These units are split in hydraulically-powered machines especially designed for this purpose, and the resultant slabs of concrete are marketed as Roughewn stone.

One of the outstanding applications of Holiday Hill stone is seen in the Dallas Country Club, in which the Bermudan shade stone blends well with the surroundings.

Roughewn stone is featured in the walls of the Stewart Company, Dallas. The split stone in Bermudan colors is laid with varying projections.

Another example of the industrial use of Holiday Hill stone in blended cinnamon shades is seen in this large warehouse and office building.

Other units which are made on the same machines, but which have variations in texture provided by the block machine or have variations in the grading of the aggregates, are marketed under the trade name of Sawn-Textured stone. This has an appearance of a semi-polished sawn stone face.

The third general classification of texture, known as the Ranchero, is a hand-textured and hand-shaped unit having varying areas of split-textured and smooth shaped texture on each unit, producing a contrast of surfaces which is quite similar to a hand-molded adobe wall.

Because of the variety of sizes which may be made in splitting the stone, many types of bond can be followed in laying the units in the wall, to achieve patterns to the individual liking of the owner or architect. Basket-weave, herringbone, Roman, random, quarter, swirl, or other patterns are quite easily produced, because the length of the unit permits laying in most unusual effects. Garden walls are often made with vented openings, adding much to the architectural or functional theme. Standard face heights of the Sawn-Textured stone are 2⅜-in. and 1 11/16 in.; width, 3⅝-in.; length, 23⅞-in. This type can also be furnished in 8- or 10-in. lengths. A natural ledged effect is often created in a two-sized, random pattern wall by projecting 5 or 10 percent of the stone.

A true effort has been made in many of the costly residences which have been built of Holiday Hill stone in the vicinity of San Antonio, to merge the indoors and outdoors into a colorful setting which is complementary in contrast. Examples of use of the stone abound in this area. Prior to 1950 less than 10 percent of the residences here were of masonry of any type; now more than 95 percent of the homes costing over $15,000 have masonry walls, and of these more than 75 percent are constructed of Holiday Hill stone.

In addition, many applications of Holiday Hill stone are to be seen in the newly-built industrial establishments. These for most part make use of the same architectural principles governing the use of color and texture in residential construction. Because the stone is competitive with face brick and other quality masonry materials, it appears that Holiday Hill has a bright future.

At the Texas Industries laboratory, Dallas, Tex., a chemist checks the physical structure of Holiday Hill stone for quality.

Another view in the laboratory shows experiments in the formulation of colors in Holiday Hill stone to obtain the exact blending desired.

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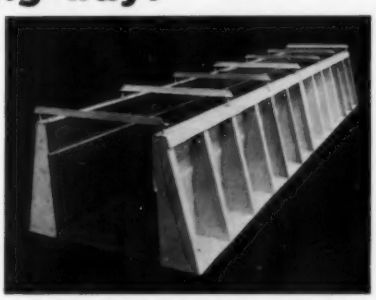

These Form-Crete rectangular bridge beam side forms and pallets are manufactured in 10-foot lengths for handling ease and are designed to produce a product that meets the demands of modern construction.

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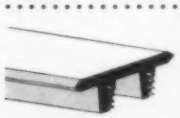
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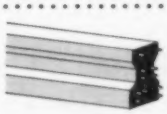
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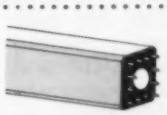
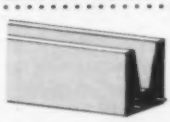

SQUARE AND OCTAGONAL PILING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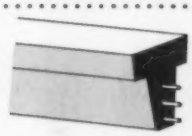
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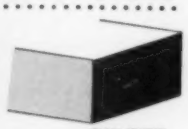
PAN TYPE BRIDGE DECKS

Production and Value of
Ready-Mixed Concrete in 1955

By KENNETH E. TOBIN JR.
Associate Executive Secretary
National Ready Mixed Concrete Association

THE National Ready Mixed Concrete Association has completed its fifth annual survey of the production and value of ready-mixed concrete. This survey is designed to fill the need for a reliable measurement of the contribution which the ready-mixed concrete industry makes each year to the national economy.

Questionnaires were sent to the 2,308 ready-mixed concrete companies in the United States of whom we have record. Returns were received from 1,212 companies. In addition to these returns statistics were also available on the 132 member companies who did not return the questionnaire. The statistics have been incorporated in the study, making a total participation of 1,344 companies, or 48 percent of the companies surveyed.

In the accompanying tables the results of our survey of ready-mixed concrete activities in 1955 are given. Table 1 shows that the reporting companies produced 69,764,099 cu. yd., valued at $829,603,783, with an average value of $11.89 per cu. yd. The results of our 1952, 1953, and 1954 surveys are also included in Table 1, so that comparisons can be made with those years.

Based on the reported production of 69,764,099 cu. yd. of concrete, we estimate that the reporting ready-mixed concrete producers used approximately 112,000,000 tons of sand and coarse aggregate and 91,000,000 barrels of portland cement. The average production per company was 51,908 cu. yd.; the median production was 27,396 cu. yd.

Table 2 presents production data on a state basis. Table 3 presents consumption data on a similar basis. This is the first time these tables have appeared in our report. They have been prepared in response to numerous requests for a breakdown of the national data, and we hope you will find them useful.

It should be noted in connection with Tables 2 and 3, that in states and territories where less than 3 companies reported, the data are not separately presented. This procedure is necessary in order to carry out our pledge to reporting companies that no use will be made of the data which might disclose individual company figures.

Table 4 is an analysis of the distribution of ready-mixed concrete production in 1955 by the size of the company, based on returns from the 1,344 concerns. The largest number of companies are in the four smaller brackets; up to 10,000 cu. yd., 276 companies, responsible for 2.3 percent of the total production; 10,000 to 20,000 cu. yd., 283 companies, responsible for 5.6 percent of the total production; 20,000 to 30,000 cu. yd., 185 companies, responsible for 6.2 percent of the total production; 30,000 to 40,000 cu. yd., 125 companies, producing 5.9 percent of the total production.

Twelve companies produced more than 500,000 cu. yd. of concrete last year, accounting for 14.9 percent of the total production. Less than 15 percent of the total yardage was produced by the 55 percent of the companies reporting in the smaller one-half (*i.e.*, below the median). Conversely, the 8.4 percent of companies in the larger brackets were responsible for more than 45 percent of the total ready-mixed concrete production in 1955.

Table 5 contains data on the amount of equipment and the number of plants (by type) in the ready-mixed concrete industry. The statistics compiled in this table include only the 1,212 companies actually returning the questionnaire and do not cover the additional 132 companies whose production statistics were otherwise available. The total number of truck mixers or agitators operated by the 1,212 companies was 16,460, representing an average of

Table 1—Ready Mixed Concrete in 1952, 1953, 1954, 1955

	1952	1953	1954	1955
Companies surveyed	1,625	1,791	1,975	2,308
Companies reporting	942	1,013	1,218	1,344
Production (cu. yd.)	49,169,443	53,404,513	61,914,534	69,764,099
Total value	$564,861,162	$636,482,350	$760,310,478	$829,603,783
Average value (per cu. yd.)	$11.49	$11.92	$12.28	$11.89
Portland cement consumed (bbl.)	62,297,152	71,082,222	82,346,330	91,000,000
Sand and coarse aggregate consumed (tons)	76,134,333	88,517,457	103,397,272	112,000,000
Average production	52,197	52,719	50,833	51,908
Median production	26,455	25,785	27,662	27,396

1955 total includes 132 member companies not actually replying to the questionnaire but whose reports were otherwise available.
1955 totals of portland cement and sand and coarse aggregate consumed are Association estimates based on reported actual production of 69,764,099 cu. yd. of concrete.
The average production was determined by dividing the total by the number of reporting companies; the median production is that of the "middle" company—*i.e.*, in this sample of 1,344 companies, the 673rd company from the top.

Table 2—Ready Mixed Concrete Output by States in 1955

State	No. of Companies	Production (Cu. Yd.)
Ala.	18	750,769
Ariz.	5	611,872
Ark.	11	301,949
Calif.	77	8,381,347
Colo.	10	929,232
Conn.	26	980,827
Del.	3	143,998
D. C.	4	766,778
Fla.	45	2,769,187
Ga.	23	642,454
Idaho	4	92,006
Ill.	84	4,577,199
Ind.	54	1,978,343
Iowa	82	1,112,023
Kans.	17	761,600
Ky.	23	657,961
La.	12	948,488
Maine	6	189,441
Md.	12	1,319,337
Mass.	24	2,108,814
Mich.	40	3,724,135
Minn.	21	716,727
Miss.	8	236,387
Mo.	24	1,516,436
Mont.	12	196,005
Neb.	6	373,410
Nev.	3	199,860
N. H.	6	69,590
N. J.	16	1,233,592
N. M.	4	228,642
N. Y.	51	4,739.136
N. C.	25	688.991
Ohio	105	5,088,505
Okla.	12	328.218
Oreg.	10	527,942
Pa.	92	3,867,221
R. I.	3	232.252
S. C.	10	133.879
S. D.	4	119,673
Tenn.	11	560,512
Tex.	54	3,324,721
Utah	4	357,236
Vt.	3	39.520
Va.	26	1,186.976
Wash.	20	1,044.236
W. Va.	15	592,909
Wis.	52	1,501.875
Alaska	3	90,220
Other[1]	2	178,562
Members not rptg...	132	6,643,106
Total	1,344	69,764,099

[1]Includes North Dakota and Hawaii.

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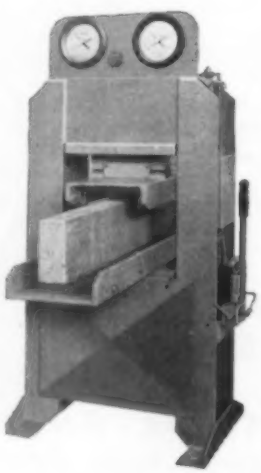

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Table 3
Consumption of Ready Mixed Concrete in 1955 by Types of Consumer

Type of Consumer	Production In Cu. Yd.	Percent
Home-building	21,424,485	33.9
Commercial constr...	9,956,045	15.7
Industrial constr. ...	9,153,398	14.7
Streets-highways ...	6,613,402	10.5
Non-federal public works	4,917,518	7.8
Federal public wks...	2,227,527	3.5
Farm construction ..	1,161,715	1.8
Other	2,128,179	3.4
Not specified	5,538,724	8.7
Total	63,120,993	100.0

(Totals do not include data from 132 member companies not actually replying to the questionnaire, but whose reports were otherwise available.)

almost 14 units per company. Proportioning plants were reported by 818 companies, which have 1,410 such plants in operation, for an average of almost 2 plants per company. Central mixing plants were reported by 467 companies, which have 635 such plants in operation, or approximately 3 plants for every 2 companies.

Our survey indicates that there are approximately 13 mixers or agitators for each producing plant. The participating companies reported 2,054 non-agitating units in operation, for an average of slightly less than 2 such units per company. Table 5 also includes similar statistics from our 1954 survey for purposes of comparison with the equipment in the industry that year.

U. S. Concrete Pipe Company Opens Ft. Lauderdale Plant

United States Concrete Pipe Company and its parent organization, Universal Sewer Pipe Corporation, both of Cleveland, Ohio, announce the completion of a new concrete pipe manufacturing plant at Fort Lauderdale, Fla. The 12,000-sq. ft. plant, occupying 20 acres, is the ninth pipe-making plant operated co-operatively by the two firms.

The new plant will produce all types and sizes of concrete pipe (including vitrified clay-lined concrete pipe) and Tylox flexible couplings for concrete pipe jointing. Facilities of the plant also provide for manufacturing special pipe to meet job specifications. The operation will provide a more direct service on concrete pipe to customers in the South.

Officers of the companies at Cleveland include the following: S. O. McFall, chairman of the board; R. F. McFall, president; H. B. Bodenhamer, general sales manager; and W. M. Lafferty, chief engineer. W. R. McGarry will direct operations at the Fort Lauderdale plant.

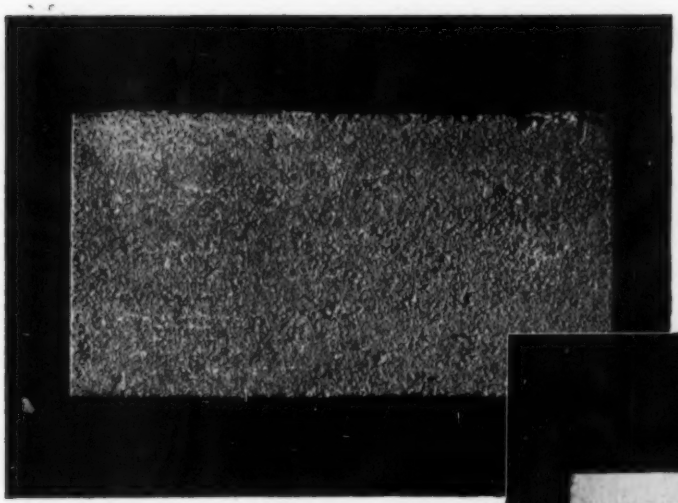
Table 4—Distribution of 1955 R.M.C. Production by Size of Company

1955 Production (Cu. Yds.)	No. of Companies	Cubic Yards Produced	Percent of Reported Production	Percent of Participating Companies	Accumulated Percents of Totals: Total Production	Accumulated Percents of Totals: Total Companies
0- 10,000	276	1,614,115	2.3	20.5	2.3	20.5
10,000- 20,000	283	3,936,753	5.6	21.0	7.9	41.5
20,000- 30,000	185	4,335,851	6.2	13.8	14.1	55.3
30,000- 40,000	125	4,121,156	5.9	9.3	20.0	64.6
40,000- 50,000	93	4,025,455	5.8	6.9	25.8	71.5
50,000- 60,000	75	3,988,083	5.7	5.6	31.5	77.1
60,000- 70,000	65	4,137,554	5.9	4.8	37.4	81.9
70,000- 80,000	44	3,180,657	4.6	3.3	42.0	85.2
80,000- 90,000	23	1,839,776	2.6	1.7	44.6	86.9
90,000-100,000	22	1,979,474	2.8	1.6	47.4	88.5
100,000-125,000	42	4,870,031	7.0	3.1	54.4	91.6
125,000-150,000	25	3,256,937	4.7	1.9	59.1	93.5
150,000-175,000	15	2,413,419	3.5	1.1	62.6	94.6
175,000-200,000	12	2,201,390	3.2	0.9	65.8	95.5
200,000-250,000	17	3,741,415	5.4	1.3	71.2	96.8
250,000-300,000	13	3,562,082	5.1	1.0	76.3	97.8
300,000-400,000	13	4,355,631	6.2	1.0	82.5	98.8
400,000-500,000	4	1,809,062	2.6	0.3	85.1	99.1
Over 500,000	12	10,395,255	14.9	0.9	100.0	100.0
Totals	1,344	69,764,096	100.0	100.0	....	....

Table 5—Equipment and Plants in R.M.C. Industry

Type	1954: No. of Companies Reporting	1954: No. of Units Reported	1954: Av. No. of Units Reported	1955: No. of Companies Reporting	1955: Av. No. of Units Reported	1955: No. of Units Reported
Mixers or agitators...	1,129	14,609	12.9	1,212	16,460	13.6
Central mixing plants.	430	552	1.3	467	635	1.4
Proportioning plants..	802	1,295	1.6	818	1,410	1.7
Non-agitating units...	1,129	2,081	1.8	1,212	2,054	1.7

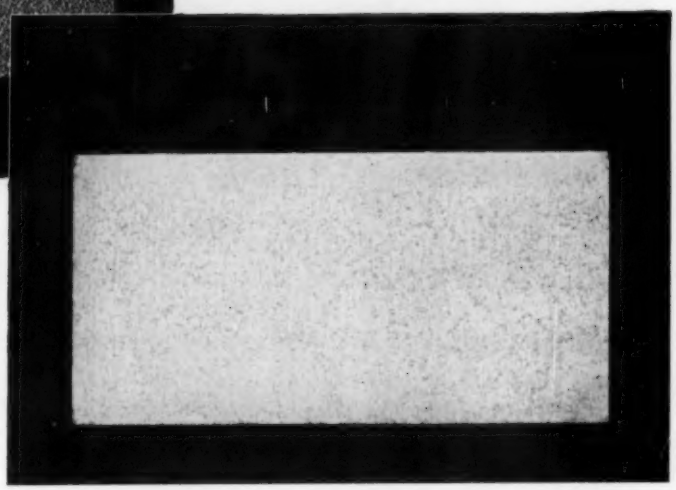
Average number of mixers or agitators per plant reported above—11.9 in 1954; 12.8 in 1955.



ORDINARY BLOCK Without NR PLASTIC—
ROUGH FINISH, DARK COLOR

IMPROVED BLOCK* With NR PLASTIC—
SMOOTH FINISH, LIGHTER COLOR

* Manufactured at HOERNING'S CONCRETE PROD. CO., Menasha, Wisconsin.



With
JUST *ONE* TABLESPOON OF
DRY, POWDERED
NR PLASTIC
PER BAG OF CEMENT!

GREATER PLASTICITY IN THE GREEN UNIT — PLUS 20% LIGHTER COLOR...
Cost... ½c per Bag of Cement!

Hydrate ALL the cement in your dry block and pipe mix . . . with just *one* tablespoonful of dry, powdered NR PLASTIC per bag of cement. Cost.....½c per bag!

YOU'LL GET . . . . . .

A 20% lighter colored unit with a more thoroughly wetted cement paste! Complete hydration through complete saturation without adding more water! Sharper corners . . . better texture . . . smoother, denser surfaces through greater compaction! Faster, cleaner feeding into . . . and stripping from . . . the mold box! 50% reduction in wear on mold box liners! Greater plasticity in the green unit through absolute dispersion of water and cement . . . and . . . complete coating of all the aggregate particles! Simple and economical to use . . . add dry as it comes from the container! Cost ½c per bag of cement!

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Gentlemen, Please RUSH Sample of NR PLASTIC

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Edick LABORATORIES

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How 1 BANTAM earned $18,000 in only 10 months!

handled sand and gravel and other excavating jobs

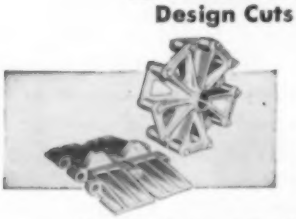
Busy BANTAM owner Weldon Laurence of Weldon Laurence & Sons, Prophetstown, Illinois, is talking from experience about a BANTAM's bigger payoff. He formerly owned a larger dragline, too cumbersome, too costly to operate and maintain for his work—excavating gravel from a river bed into stockpile and truck loading it . . . as well as other digging jobs, Laurence switched to the low-cost BANTAM method.

In his own words, businessman Laurence says: "I find the BANTAM ideal for gravel and basement and ditching work. It has the ability to move easily. I like its ease of operation. We'll average $18,000 a year income from our BANTAM, working only 10 months."

That's not all. This BANTAM booster also reports: "My BANTAM has worked harder and more in the past 2 years than other rigs in this area do in 5 years." Laurence now has his second BANTAM!

You can cut your costs, too, with a BANTAM! Mail the coupon.

New BANTAM Crawler Tumbler and Shoe Design Cuts Track Maintenance Costs!



New drive tumbler has mounted pins which provide a *rolling* contact between hardened rollers and pins and track lugs—virtually eliminating wear and damage caused by excessive abrasion. With BANTAM design, driving lugs of shoes have an involute or curved surface for correct engaging action during travel. Fast on-the-job replacement eliminates costly down time and work delays.

World's Largest Producers of Truck Cranes and Excavators

T-35

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SCHIELD Bantam Co.

Schield Bantam Co. CP 22
298 Park St., Waverly, Iowa
Rush me full details on ____ Crawler BANTAM, ____ Truck-Mounted ____ Self-Propelled.

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Simplified Methods Cited By Norwegian Author In Concrete Testing Book

Field Testing of Concrete, a 64-page book by Sven Thaulow, construction engineer, A/S Christiana Portland Cementfabrik, Slemmestad, Norway, presents new methods and equipment for testing and controlling concrete and aggregates under field conditions. Simplicity of equipment is stressed throughout the abridged edition of the book, in order to minimize errors resulting from faulty or inconsistent use of the machines.

Testing equipment and experimental development are covered in detail. Other sections deal with testing of aggregates, fresh and hardened concrete; determinations of specific gravity and surface moisture of aggregates; determinations of consistency, unit weight, and air content of fresh concrete and concrete products; and testing of hardened concrete, including determinations of unit weight and water absorption. The book is fully illustrated.

The English translation of the book was made by Professor Alexander T. Andreassen, Pennsylvania State College, who also assisted in its editing. The American Concrete Institute made an authorized reprint of the testing equipment and methods used by the author in determining the composition of the concrete by the four methods of absolute volumes, weight, weight under water, and by the washing method.

D. S. Craven

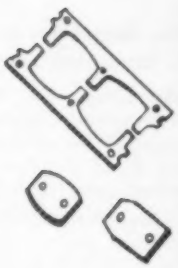
Commander David S. Craven, U.S.N., has been named superintendent of maintenance for Louisiana Industries, Inc., according to an announcement released by Morgan McCall, executive vice-president.

Commander Craven has been inspector of naval material, Dallas, Tex., for three years. Previous duty was in the Office of Naval Material, Washington, D. C., working on mobilization planning. A registered mechanical engineer, he is a member of the Society of Automotive Engineers, and the American Society of Naval Engineers.

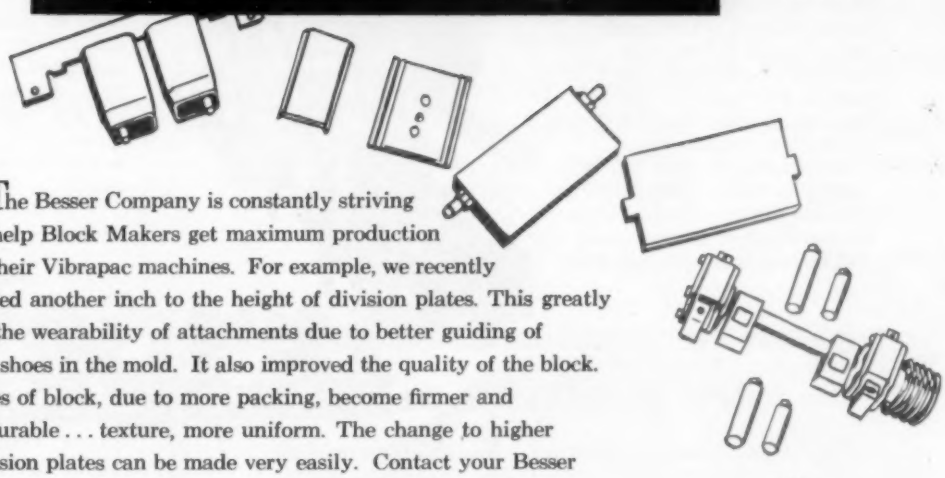
Louisiana Industries, a subsidiary of Texas Industries, recently acquired the New Orleans ready-mix business of Schwartz Supply Co.

New Higher Division Plates
Step Up Quality and Production!

VIBRAPACS
Run Smoother with Genuine
BESSER PARTS

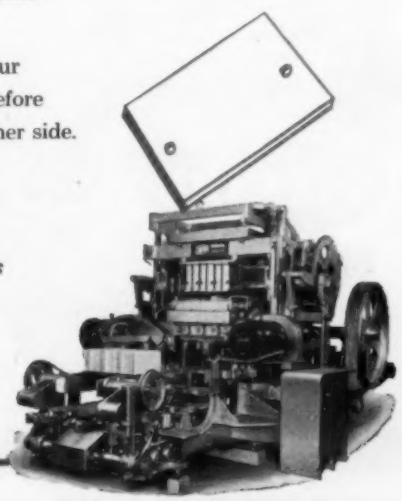


PART NUMBERS
Outside Division Plates
No. 55312
Inside Division Plates
No. 58980
Cut-off Bar
No. 57768
Outside Cut-off Shoes
No. 57769
Inside Cut-off Shoes
No. 57770



The Besser Company is constantly striving to help Block Makers get maximum production from their Vibrapac machines. For example, we recently added another inch to the height of division plates. This greatly increased the wearability of attachments due to better guiding of stripper shoes in the mold. It also improved the quality of the block. Edges of block, due to more packing, become firmer and more durable . . . texture, more uniform. The change to higher division plates can be made very easily. Contact your Besser representative for details.

Tip to Block Makers — You can get double duty from your cut-off shoes if you change from one edge to the other. Before wearing ⅛" on one side, turn cut-off shoe over and use the other side.



BESSER Company
BOX 131, ALPENA, MICHIGAN, U.S.A.
Complete Equipment for Concrete Block Plants

BESSER Genuine PARTS

GENUINE **VIBRAPAC** *PARTS ARE MADE ONLY BY BESSER*

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Five-Year Index Supplement Covers '49-'54 A.C.I. Papers

The American Concrete Institute recently published an index to the *A.C.I. Journal* covering contributions in the form of papers, reports, and discussions, in the three categories of title, author, and subject, for the period from September, 1949, through June, 1954.

The first half of the 72-page book is devoted to the index, the second to synopses. The index supplements the *A.C.I. 20-Year Index* published in 1950, which covered *Journal* issues from November, 1929, through June, 1949 (*A.C.I. Proceedings*, Vol. 26 to 45).

Copies of the 5-year index are available at the American Concrete Institute, 18263 McNichols Road, Detroit 19, Mich., at 35 cents each.

T. L. Smith Co. Mixer Plant In Production at Lufkin, Tex.

The formal opening of the Lufkin, Tex., plant of The T. L. Smith Company on May 16 marked the establishment of the Southwest's first plant for manufacturing concrete mixers. The new facilities, located on a 20-acre site just outside of Lufkin, cover approximately 45,000-sq. ft. of manufacturing space and 9,000-sq. ft. of office space.

Designed to manufacture truck mixers, agitators, stationary tilting-type mixers, and portable concrete mixers, the new facilities will serve the southern and southwestern sections of the country, as well as the Latin American export market.

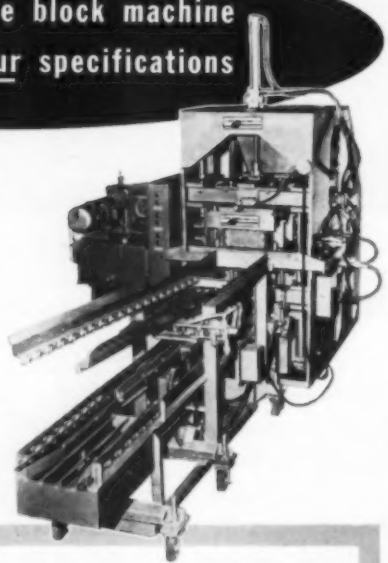
T. L. Smith began manufacturing mixers in Milwaukee, Wis., in 1900, and has been located at its present address, 2835 North 32nd Street, since 1916.

Gen. Prentiss Begins Term As A.R.B.A. Executive Secy.

Maj. Gen. Louis W. Prentiss (U. S. A. Ret.) recently assumed the duties of executive vice-president of the American Road Builders' Association, succeeding Gen. Eugene Reybold (U. S. A. Ret.).

General Prentiss, a graduate engineer of the Colorado School of Mines, has a background of over 35 years of distinguished military service. He was promoted to his present rank by President Eisenhower in 1954, and in December of that year he took over command of the Engineer Center at Ft. Belvoir, Va., serving in that post until his retirement.

here is the single block machine built according to your specifications



Here is a block machine – the Fleming Model "10" single down stripper – that really makes sense. It has been designed, built, tested and proved by engineers who have *made their living* by *producing concrete block*. The Fleming Model "10" is equipped with advanced features formerly found only in far more expensive machines. Yet its cost is *surprisingly* low.

these features are YOURS with the Model "10"

- Front Pallet Feeder and Ejector
- Electronic Height Control
- Smooth-Flowing, Rugged, All-Welded Construction
- Vibrator, Removed from Machine, is Mounted on Reinforced Concrete Slab
- Long Life, Minimum Maintenance, *Guaranteed* to Produce Highest Quality Block
- Factory Tested at 240 Cycles an Hour.

FLEMING

Gentlemen: Please rush complete information, including specifications, prices and terms on the following:

☐ FMC 10 ☐ FMC-180
☐ FMC 20 ☐ FMC Block Splitter
☐ FMC 25 ☐ FMC Stationary Mixers

MAIL TODAY!

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FLEMING MANUFACTURING COMPANY • 489 Fleming Ave., Cuba, Mo. • Phone: Cuba 400

R. O. Campbell

The appointment of Robert O. Campbell as executive vice-president and general manager of Pre-Mix Concrete, Denver, Colo., has been announced by J. E. Hackstaff, president.

Mr. Campbell came to Denver to join Pre-Mix in 1952, and was made secretary and a director of the company during the following year. As head of the Moisture-Meter division of Pre-Mix, he has visited and inspected concrete plants all over the United States and Canada.

In recent years the company has developed exclusively, under the trade name "Instant Moisture Control", an electronic moisture-meter for accurately determining the amount of free moisture in the aggregate before water is added, thus providing a scientific control of the quality of the concrete.

save $40 per month

on gas and oil alone

Careful records by operators for a full year of tough schedules prove that the Smith Integral* saves more than $40 per month on gas and oil alone compared to separate engine drives.

It's the "engine loafing" that hikes maintenance costs

With a separate engine drive, high maintenance results from *loafing* the truck mixer engine—not from working it to death.

The Integral NEVER LOAFS

In the Integral, the truck engine always operates at efficient speeds. Carbon buildup is eliminated.

There is plenty of horsepower from the truck engine alone because *the only times extra power is needed, the truck is standing still.* This is for charging and discharging. Full horsepower from the truck engine is thus available for both operations. Once the drum starts revolving, only about 5 to 10% HP is taken from the engine.

If you don't need two engines, why pay for two? *One* is actually more efficient.

Write for full details about the cost-saving Integral.

Since 1900, the pioneer designer and foremost manufacturer of the world's finest mixers.

SMITH

integral*

ONE FRAME FOR BOTH TRUCK AND MIXER — ONE ENGINE FOR BOTH

*TRADE MARK

THE T. L. SMITH COMPANY, Milwaukee 45, Wisconsin; Lufkin, Texas

Affiliated with Essick Manufacturing Company, Los Angeles, Calif.

Ad No. A8784-1P

Faced Concrete Block

*new developments may be concrete masonry's answer to competitive challenge**

THE last few years we have seen concrete block virtually replace stone and brick as a basic building material. As phenomenal as this rise in popularity has been, however, I believe we are about to see an even more widespread use of this material in years to come.

The reason is that there are new types of faced concrete block. New techniques in applying decorative facings to standard concrete block have combined lower cost of manufacture with superior, enduring finish on one (or more than one) face, giving a product that is both structurally strong and aesthetically satisfying — a multi-purpose material. Manufacture and distribution of this modern construction material is widening every day. These recent developments have made faced concrete block a logical answer to today's high construction costs; it is an advanced building material with uses that have barely been tapped, and it may provide masonry's answer to prefabricated metal panels in 20th-century low-cost construction.

The advantages of concrete block faced with a durable, colorful, and inexpensive exposed surface are fairly obvious. Properly faced block combines the structural strength and fire resistance of concrete with the physical appearance of an eye-appealing exterior or interior facing material.

Today, brick, stone or some other skin facing material is ordinarily specified to produce an attractive and weatherproof exterior in concrete block construction; tile, painted plaster, or some similar material is usually specified for pleasing, functional interiors. Faced block, however, offers the structural strength of concrete plus the functional attractiveness of glazed tile, at a great saving in construction costs. It can be faced for exterior or interior use, or for both.

The facing colors, design effects, and textures which can be produced are almost endless. As faced block finds increased acceptance with the public and the building industry, undoubtedly the types and variations of block available will also increase greatly.

Even today, however, decorative surfaces can be added to one or more faces of block at extremely low cost. The saving in construction costs is obvious. In effect, using double-faced block, the outer wall, frame, and inner wall of the structure are completed in one operation.

There are now available several types of faced or coated block. Each has been brought to a stage close to perfection. However, none can yet be called the perfect "all-purpose" block which will nudge present facing materials out of the picture completely.

Three major categories of faced block are now on the market. The first type has a cast face composed of a terrazzo-type mixture. The second has a laminated plastic face. The third, and newest type, is a true monolithic faced block with a vitreous glazed cement surface.

This newest type of block facing is neither laminated to the block nor cast onto it. The facing is a natural glazed surface of a cementitious mixture which is ideally cured. It is a low-cost, washable, non-staining, and attractive surface.

The three types of faced block mentioned above are contending today for the structural-decorative market. There is one other adversary in the picture—structural glazed clay tile. However, this product has a narrower use in building construction because of strength limitations and cost. It is 2 to 2½ times more costly than the most expensive coated concrete black.

Terrazzo-type facing on concrete block is composed of crushed marble chips and marble dust, mixed in colored cement. The resulting mixture is cast 3/8 in. thick and simultaneously bonded to concrete block. The faced block is then steam-cured and stored. This block can be used for both exterior and interior walls. The facing can be applied to both interior and exterior faces of the block, forming a combination structural-decorative unit.

Terrazzo-type faced block comes in a wide range of colors, with a smooth, dust-resistant finish. Soap and water washing is the only regular maintenance required.

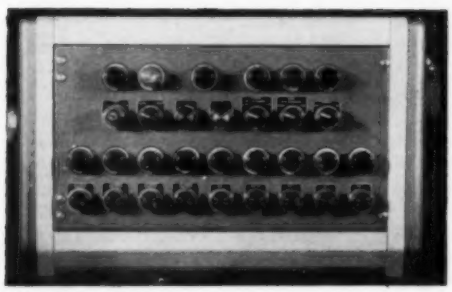
Manufacturers of this type of faced block state than the block and the facing material will not separate under even the most severe conditions, and that the face will not crack unless the block is broken. The unit is not affected by extreme heat, cold,

*Presented before the Society of Construction Superintendents, Inc., May 8, 1956, in New York, N. Y., by George Kogel, president. The Cincrete Corporation, Long Island City, N. Y.

CALL ON Quinn
For QUALITY
CONCRETE
PIPE
FORMS
"STANDARD"
The World Over
Backed by over 45 years of reliable service, the QUINN Heavy Duty form is recognized as the STANDARD design and the finest concrete pipe form everywhere. Used in making pipe by vibration, spading or tamping. Sizes for pipe from 10" to 120" and larger. Tongue and groove (as shown) or bell end pipe in any length desired. If your pipe orders specify extra large sizes, odd shapes or unusual lengths, there's a Quinn form made to produce the finest pipe at lowest possible cost.
Also Manufacturers of
QUINN CONCRETE PIPE MACHINES
Free CATALOG
Illustrates our complete line of equipment. Contains pages of valuable tips for the concrete pipe manufacturer. Write today for your free copy and estimates.
Quinn WIRE & IRON WORKS
BOONE, IOWA

Unitized for ease of maintenance, the Helco-matic requires no specialized attention.

Helco-matic* Batchmaster

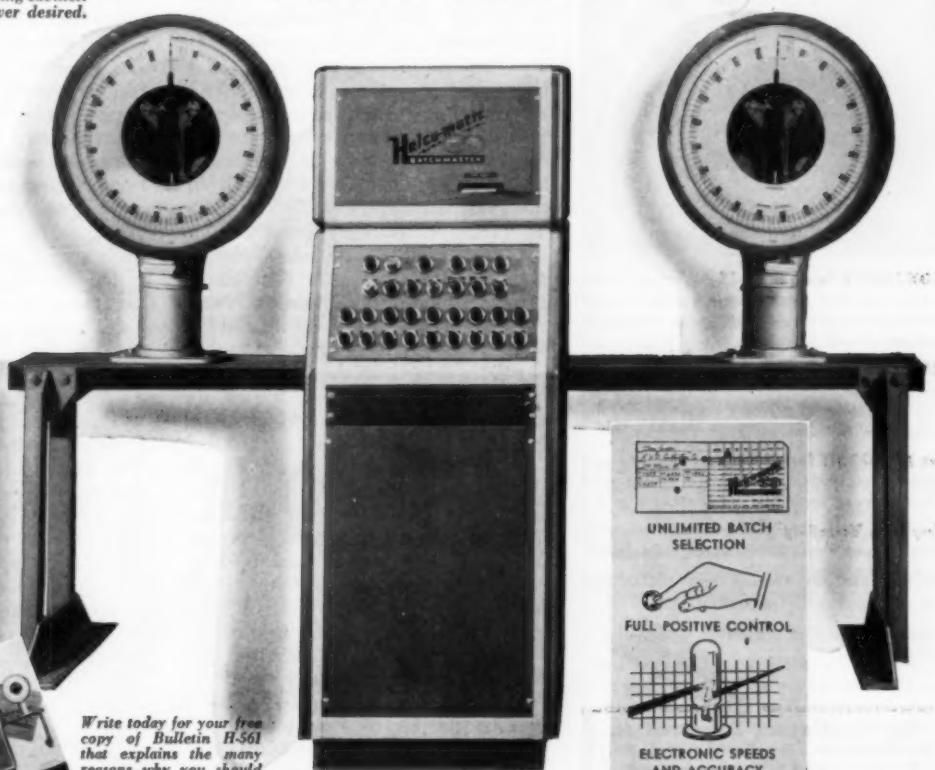


Compact, the entire unit is no larger than a standard filing cabinet. Can be installed wherever desired.

THE ABSOLUTE ULTIMATE IN AUTOMATIC BATCHING

Here's the most revolutionary development in automatic batching in more than a decade. The **Helco-matic Batchmaster** unites, for the first time, the speed and accuracy of electronics with commercially acceptable weighing units to give ready mix concrete producers the finest batching system in the industry today.

Incorporating the IBM punch card system, the Helco-matic enables users to batch any amount of any number of materials in any sequence automatically and have a complete and permanent record of the transaction. There IBM cards can be used for establishing complete inventory billing and costing systems for all raw materials or finished products handled in your daily business. Aside from unlimited batch selection and its remarkable accounting features, the Helco-matic provides ready mix producers with a system that automatically compensates for moisture, by weight, plus a system that meets all known state and federal batching specifications. Before you buy any batching equipment, be sure you have all the details on this amazing new Helco-matic unit. Write for your copy of Bulletin H-561 today.



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For Better Control Joints

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RUBBER EXTRUSION

- No Cutting or Sawing.
- No Need for Special Blocks.
- Use with Any Standard Metal Sash Block.
- No Building Paper or Mortar Filling Needed.

BLOK-JOINT'S "cross-shaped" rubber extrusion design simplifies construction of masonry wall control joints. Use BLOK-JOINT with **any standard metal sash block!**

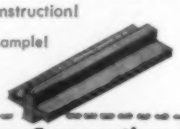
"100 Year Life" rubber assures maximum effectiveness for the lifetime of the building. BLOK-JOINT forms a secure interlock, actually adds stability to the wall.

Use BLOK-JOINT for all types of masonry wall construction!—Block walls, brick veneer over blocks, cavity walls and many other types!

Simplicity, Versatility and maximum effectiveness are yours with Carter-Waters BLOK-JOINT.

NOW! See For Yourself how BLOK-JOINT fits masonry wall construction!

Write Today for FREE sample! Use this coupon.



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Please send me a FREE sample and specifications on the new Carter-Waters BLOK-JOINT.

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or humidity. These blocks are also termite-proof, vermin-proof, and fireproof. They meet all federal and local code specifications for hollow load-bearing concrete masonry units.

This type of block is typically made on a low-production machine which makes the cost of the basic block relatively high. Coating a fresh, uncured block also makes for production difficulties which are reflected in higher costs.

The facing is usually larger than the block to which it is affixed, so that it overhangs on all sides. This results in a wall with extremely small visible joints, closely resembling tile or facing stone. However, this overhang results in a high rate of damage to units in handling at the plant, during delivery, and on the job. The block is also more difficult for the mason to install, which leads to higher costs.

A newer entry into the faced-block field is the plastic-faced block, which are now available in several types. These differ in appearance, but are structurally quite similar. The plastic facings are usually composed of a thermo-setting resinous binder, coloring agents, fireproofing agents, and other ingredients as determined by each manufacturer. The facing is joined to the block in a separate operation after block production. The block is first formed and cured in the usual manner. Usually, the plastic facing material is poured in a semi-liquid state into metal forms about 1/8 in. in depth. The block is next placed over the plastic. Plastic and block are then heated in ovens at 350 deg. F. until the facing is solidly joined to the block. Once the process is completed, the facing cannot be removed without destroying the block itself.

Surfaces of plastic-faced blocks show good resistance to acids, alkalis, stains, oils, fats, and the like. They have withstood extreme ranges in temperature. Resistance to abrasion, heavy impact, and compression loads also is satisfactory. In general, the facings are fire-retardant.

The decorative possibilities of plastic-faced block are broad in range, although the surfaces have a certain degree of "scratchability." One manufacturer has achieved interesting effects by embedding printed paper designs in the plastic coating.

Plastics are still expensive materials, however, and the thermosetting resins require the use of bake ovens in the manufacturing process, thus increasing the cost. Another factor which slows down production and increases costs is the necessity of using pans in which the faces are cast.

As noted with terrazzo-type materials, the facing is usually larger than the block on all sides, resulting in an overhanging lip. This lip is also subject to damage in the plant, during delivery, and on the job. Masons charge more for laying this type of block because of the precise work involved.

The newest entry in the field, and one which, I believe, is bound to challenge all other types in structural applications, is cold-glazed cement block.

This new block facing offers all the qualities of ideally cured concrete plus an exceptionally low cost of manufacture — lower than any competitive process today. This facing is waterproof, washable, nonstaining, and architecturally attractive.

Cold-glazed cement finish consists essentially of portland cement, graded silicas, mineral pigments, and special organic hardeners which create a surface glaze. This glaze is the result of a controlled process in which the water of crystallization and the cement particles form a surface of glazed concrete. A very thin temporary sealer retains moisture in the concrete until the final curing stage is completed. The only function of this sealer is to retard the curing. It eventually disappears, leaving a naturally glazed surface of maximum hardness.

The finish is applied in a cold liquid form, sprayed on the block to a thickness of 1/16 in. It is smoothed out by vibration. After curing under controlled humidity conditions, a very dense, hard finish is produced.

This glazed surface forms a monolithic structure with the block itself. The glazed blocks are handled and laid up in the same manner as unfaced block. No special care is necessary, due to the fact that, prior to the glazing operation, the edges of the cured block are lightly ground to give a "cushion" or rounded edge. This eliminates chipping or breakage problems. Close tolerances and negligible face distortion permit rapid erection of smooth, plumb masonry walls.

Since the materials used to form the glaze are essentially cementitious mixtures, cement analysis and performance data apply. Elongation, tensile strength, flexibility, and shock resistance are approximately equal to high-strength concrete. Abrasion tests remove surface gloss, but not color or pattern. Water absorption is about .3 percent. Since the material "breathes," water under hy-

drostatic pressure presents no problem. The cold glazed surface also shows good chemical resistance.

The application of cold-glazed cement finishes is a relatively new craft. Cold-glazed block is new in the United States, although the process itself is not new.

European makers of cement tiles discovered that the natural glaze which often occurs in a spotty fashion in any trowelled cement finish can be artificially controlled and rendered permanent.

First patents on a cold-glaze process were issued as early as 1908 in Germany. The first on-site applications on this continent were in Canada in 1932. Only within the last year did this process become available in the United States for mass production of coated block, when United States rights were obtained by Vitricon, Inc., in Long Island City, N. Y. Factory-glazed blocks will shortly be produced nationally by concrete block manufacturers enfranchised by Vitricon. These cold-glazed blocks, to be marketed under the trade name, Vitricon, will be manufactured according to uniform standards and specifications.

Cold-glazed block can be manufactured according to uniform standards and specifications.

Cold-glazed block can be manufactured in a variety of color combinations, textures, depths of finish, or other specifications of architect or designer. Unlike many concrete block facings, this one does not try to imitate the appearance of other materials. It has a character of its own in that it has depth, may be multicolored, and does not imitate the flat monotone effects of tile and some plastics.

Cold-glazed faced block is too new on the American scene for a realistic estimate of its possible applications. At first, its main use probably will be in partitions. However, its eventual major use will undoubtedly be for exterior walls, where cost is a prime factor, since the cold glaze finish adds only about 25 cents a square foot to the cost of unfinished concrete block, as presently marketed.

The waterproofness of mortar has always been a limiting factor in the use of masonry materials. It is highly encouraging, therefore, that coincidentally with the introduction of cold-glazed block on the U. S. market, chemical technology is now introducing various additives (silicones, stearates, etc.) which may be integrally mixed with mortar or applied afterwards on the joints to make them impervious.

Low-cost, attractive cold-glazed block, combined with waterproof mortars, provide a totally new economy-quality combination in the construction of schools, churches, factories, laboratories, garages, hospitals, hotels, and institutional buildings.

Comparative costs of the faced masonry units referred to above follow. All costs are f.o.b. from the plant nearest New York City for an 8- by 16-in. face or equivalent area.

1. Structural glazed tile	$2.50	each
2. Terrazzo type	.67	each
3. Plastic No. 1	1.06	each
4. Plastic No. 2	.885	each
5. Plastic No. 3	.87	each
6. Cold glazed cement	.489	each

It is apparent that the cold-glazed cement faced block is by far the least expensive.

Each type of block discussed represents a step in the evolution of an easily-produced, structurally sound, decoratively faced building material. This evolution has seen the addition of texture and color to an ordinary concrete block, followed by the development of ultimate bonding of surface to block; then the devising of tougher, more wearable surfaces; finally, a constant reduction in cost of manufacture.

The final result, it seems to me, is easy to foresee — the eventual replacement, in many areas of construction, of more "conventional" building materials by glazed concrete block. The extent of this structural revolution will be determined by the imagination and inventiveness of America's architects and builders.

Marble-Faced Blocks Provide Streamlined Wall Finishes

A marbleized facing applied to either or both faces of a machine-made concrete block during the normal production cycle is being offered by Marble Faced Blocks, Inc., Kenilworth, N. J. This provides a finished structural wall in one operation, either interior or exterior face having a smooth, hard, surface in a variety of shades.

The marbleized surface may be created on concrete block made of any approved aggregate, the price of the treatment varying according to the thickness of the finish, the size of the unit, the type of facing desired, and the color combinations used. Normally, the extra cost will run from $.60 to $1.25 per unit, according to the manufacturer's estimate.

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MASONRY WALL REINFORCING

- Exclusive Deforming Provides Large, Well Defined "Squared Edges"
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You can see at a glance the extra "grip-ability" of Carter-Waters BLOK-MESH. The horizontal and vertical surfaces provide a sure lock even under lateral pressure and shrinkage.

BLOK-MESH Minimizes Cracking above lintels, below sills, at corners.

BLOK-MESH Is Best to tie brick to back-up blocks, for cavity wall construction, double walls, ordinary block wall construction.

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SAFETY NEEDS PROMOTION

By J. E. BEDFORD
Professor of Management
Armstrong College
Berkeley, Calif.

A REVIEW of the safety record of any concrete plant will reveal that the accident rate goes down during a safety training program. It is held down immediately following this type of program. Then, suddenly accidents will start to happen all over the plant. The concrete plant's accident rate will then be as high as or higher than it was before the safety program was put into effect. Why does this happen?

Usually it is because the newness of the safety program has worn off around the plant. Workers and supervisors have fallen back into their old habits. They neglect to keep practicing the safety rules covered in the initial safety training program.

When the accident rate starts to climb, concrete plant management is apt to consider the safety program a waste of time and money and to cast it aside. This may pare a few dollars from the evident overhead expense, but the hidden cost of accidents will remain—lost time, reduced production, more equipment repairs, and lower employee morale.

Progressive concrete plant management does not stop the sales promotion and advertising program when business starts to decline. They put more effort into promotion. This may include more aggressive selling, sales contests, more extensive advertising, or an offer of extra commission for the salesmen. Whatever is done, it is promotion—not a "cease motion" order.

Safety programs need a shot in the arm to keep them at top efficiency and to keep the accident rate at a low level. Here are some ideas other concrete plants have found helpful in promoting their safety programs:

1. Bulletin Boards—Safety posters can be purchased in quantity for use on your bulletin boards. However, this type of poster usually falls into a standard pattern. A check with the employees in the plant the day after the poster has been changed will not reveal much identification or interest. Workers form a habit of "tuning out" the standard safety poster, just as they have learned to tune out radio and TV commercials.

A part of the reason for this lack of interest in the prepared safety posters is that they lack plant human interest. The people pictured on the poster are not known to the employees in your plant. The scenes illustrated may be for an accident in a steel mill or a tire plant and may lack industry identification necessary for arousing the interest of the employees in your plant.

However, when this poster idea is

changed to a poster of an accident in *your* plant, a photograph of one of *your* men who has an enviable safety record, or a picture of one of the accidents in *your* plant, the workers will read and remember the safety poster. This poster will have plant human interest for those in your plant.

Concrete plants that have adopted this idea of posters make these recommendations:

1. Change the posters frequently—at least every two weeks.

2. Picture current accidents—not ancient history in the plant.

3. Have the poster tell the story—who, what, and why, and how the accident could have been prevented.

4. Keep copy on safety posters to the minimum—people do not have time (or will not take time) to read a long message.

2. Personal Letters—Every time the safety records of employees are reviewed, it is a good plan to see that the safe worker receives some kind of personal letter from a top executive in the company. This can be a short note of congratulations to each employee who has gone through the period—six months or a year—without an accident.

These letters can follow a set form, but they should be made personal by a review of the individual's long standing safety record. If the employee received a safety letter a year ago, for instance, the second letter might start something like this:

"Last year when I wrote you about your fine safety record, I sincerely prayed that I would be able to send you another letter this year. You have gone two years without an accident! Congratulations, John."

Concrete plants with a limited number of employees have found that this form of stimulation is best when the letter is delivered to the home of the safety-minded worker. It helps the family to realize how important safety is considered by the boss.

Larger plants have a system of writing more frequently to new employees. Statistics prove that new workers are more accident-prone than older workers. Thus, new employees receive a letter when they start, after a month, three months, six months, nine months, and one year. After this period the new worker is placed on the regular rolls of safe workers.

Another good plan is to send one letter to the men in one department and another to those in another department. Thus, the entire department is congratulated for its safety record; and this starts a form of rivalry between the different departments to establish the best safety record.

Plant management using personal letters recommend the following rules:

1. Don't use a mimeographed form letter—make it personal.

2. Tie the letter in with past safety letters to make the congratulations more personal and more sincere.

3. Work out a system so that none of the employees are overlooked in this safety letter program.

3. Contests and Drawings—Safety contests have been used in many plants, with a wide variety of results. If the contest is successful in keeping the accident rate at zero for any period of time, the contest drags on for months. Employees tend to lose interest after a month, and the value of the safety contest is lost.

However, if the accident rate is particularly high in a plant, the contest can be used for a short time to provide a stimulant to get things on an even keel. Then, after the contest has run for 30 days, have the awards made. This will eliminate the long-drawn-out waiting and the lack of interest that may develop.

Another form of contest which plants have found successful is to have a weekly safety drawing. Management puts up a weekly safety award—$5, $10, $25, or whatever is in line with the number of employees in the plant and the seriousness of the accident rate. Each week the workers who have had 60 accident-free working days are entered in the drawing.

After a worker has had an accident, he must maintain a 60-day safety record before he can participate in the weekly drawing. This keeps everyone safety conscious and ties in with the payroll pools that have developed in many plants.

A variation of this weekly drawing is to eliminate all workers when there is an accident in the department or division. Thus, all employees in the department suffer if one employee has an accident. Safety is a topic of conversation, observation, and activity all the time.

Best results are obtained when the contests and the drawings follow these suggestions:

1. Keep the time limit of the contest under 30 days and drawings on a weekly basis.
2. Make the rewards worth while.
3. Post contest results or drawing winners as soon as possible.
4. Emphasize safety in all activities connected with the contest or the drawing.

These three methods of promoting safety are by no means the complete list. They represent ideas which other firms have found helpful. Variations of these ideas and other methods of promoting safety can be developed in any concrete plant.

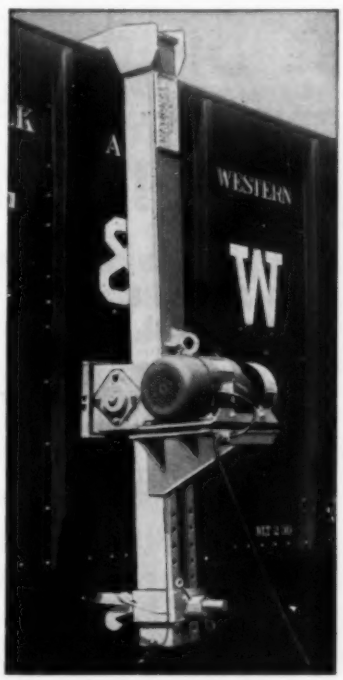
Any management with a keen desire to maintain a low accident rate will find plenty of ways to remind the workers and supervisors that *safety is everyone's problem—everyday!*

• First cable dump trailers in Colombia line up against the backdrop of Bogota's modern skyline prior to going to work between the Central de Mezclas ready-mix concrete plant and sand quarry in the Andean Mountains outside the city. The two 15-cu. yd. capacity tandem trailers were built by Hobbs Trailers of Fort Worth, Tex., and were brought into Colombia and sold by Mercantil Praco Ltda., Hobbs (and Mack truck) distributor in Bogota.

SHAKE CLEAN FAST

WITH THE

NATIONAL Car Shaker



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- Soon pays for itself
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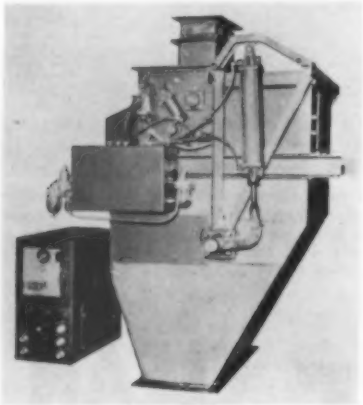
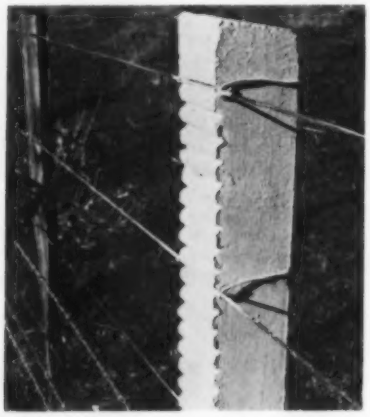


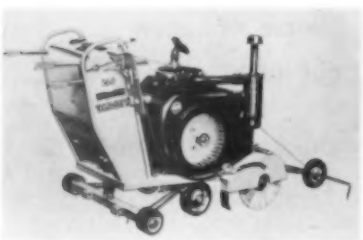
● Model 700N batching scale, manufactured by the Thayer Scale and Engineering Corporation, has a rotary-type feeder for charging a gateless tipping-type weigh bucket. A cycle timer controls the automatic charging and discharging of the weigh bucket. ↟ (101)



● The corrugated concrete fence post, available from the Portland Corrugated Fence Post Company, allows any number of wires to be attached at any required spacing. The wires are placed in the corrugations at the required height and held firmly in position by the tie. ↟ (104)

● Motorola's compact "Compa-Station" transmitter-receiver features a removable control panel which can be mounted on the bottom front, top front, or top of the cabinet for versatility in installation. The low cost unit includes a 60 watt transmitter and the Motorola Sensicon "G" receiver. The 22- by 13½- by 29-in. cabinet provides proper ventilation for base station operation, and has full length front and rear key-locked doors. Weight is approximately 100 lb. ↟ (105)

● Applications of this new heavy duty air hammer, a product of Superior Pneumatic and Manufacturing, Inc., include pallet cleaning and cleaning concrete from mixing equipment. The air hammer can be operated with one hand and delivers up to 2,200 blows per minute at less than 80 p.s.i. A patented safety chuck locks the tool in six positions. ↟ (102)



● Target Model 360, an automatic self-propelled concrete saw made by the Robert G. Evans Company, offers the operator precision hydraulic adjustment of blade cutting depth and fingertip selection of cutting speeds of 1 to 25 ft. per minute while the saw is in motion. The 36 hp. engine is equipped with a collector-type precleaner for protection against the dust and slurry of concrete sawing. ↟ (103)

JULY, 1956

MORE INFORMATION PLEASE

THE CONCRETE MANUFACTURER
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CHICAGO 5, ILLINOIS

Please send more information on items described in editorial columns of this issue, as circled below.

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(1) Improved Vibration and Production Speed-Up

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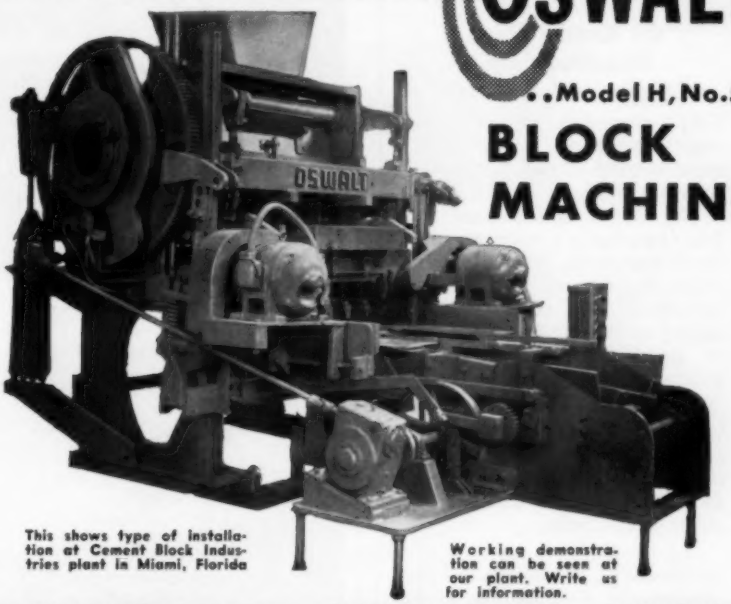
Today's most modern design block machine in its field.



This shows type of installation at Cement Block Industries plant in Miami, Florida

Working demonstration can be seen at our plant. Write us for information.

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Erickson has created a revolutionary new idea in platform trucks—it's ARTICULATED—with a joint or pivot between platform and drive wheels. Models P-7A and P-10A are the units for the new and unusual operations,—autoclaves, for instance—where you need utmost maneuverability with heavy duty capacity. With the ARTICULATED design, platform bed can be made up to 10 or 12 feet and still handle heavy, bulky loads with ease. These articulated models are in addition to the veteran Erickson P-5 and P-7 standard models, and built with the same rugged durability.

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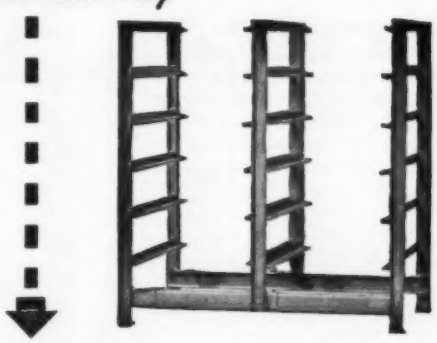
CHASE BLOCK RACKS, PLAIN STEEL PALLETS

Your best buy



Here's why • • • Standard style or specially designed, Chase racks meet your requirements. They're shipped painted and knocked down—assembly is easy—no special tools or welding needed. Chase experience means low prices and years of dependable service. Check Chase prices.

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COMMENT
from the
BUTLER ENGINEER

Of Ready Mix, Roadbuilders, Blocks and Awards

Very interesting, very gratifying, very sound is the sharp trend toward automation in the concrete products industry . . . When Butler Bin piloted the first completely automatic, one-man operated Roadbuilders Plant we expected the rush that followed. And Butler automatic, electronic batching, led to quick conversions in the Ready Mixed field.

And now we find that the concrete block field has been equally alert to see the tremendous advantages of automation in product control and in production economy.

•

Incidentally, Butler entered the automation field in the right position: first—and we still are.

•

And speaking of Roadbuilders set-ups, one of the fine national magazines, CONSTRUCTION EQUIPMENT, cited the Butler Automatic One-Man Roadbuilders as Product of the Month. This is an award made only after careful analysis and screening by a completely impartial board of judges. We're very proud — but we're *not* in the nose-in-the-air department. Head in the clouds maybe but feet very much on the ground — and determined to win the Award again. A sweeping bow to CONSTRUCTION EQUIPMENT. A martini will be hoisted in thanks by the Butler Engineer at 5:00 P.M. today. Maybe every day.

•

Went to the movies t'other night. Kim Novak in "Picnic". Those who can take their eyes off the delectable Miss Novac, will see a Butler Ready Mix Plant in the background in one scene. You missed the background? I don't wonder.

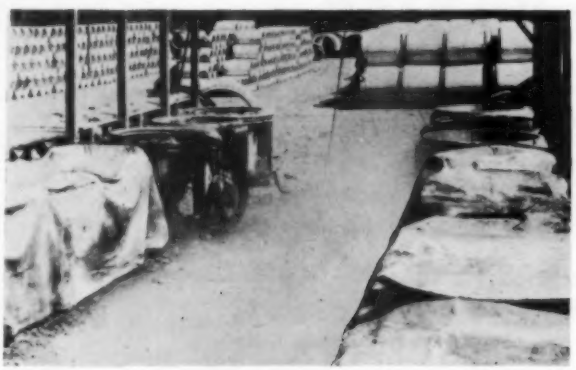
I'm Kim-minded,

The Butler Engineer

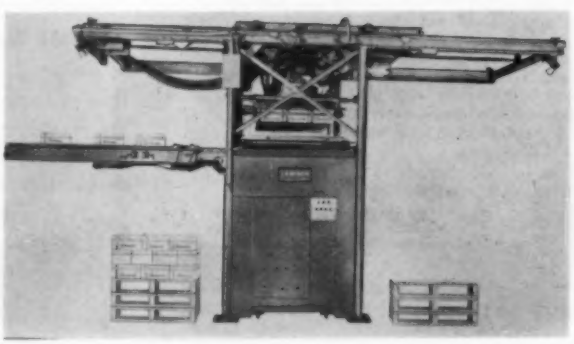
BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

● The Crane Carrier Corporation, manufacturer of extra heavy-duty off-the-road trucks, is now turning out 74 models of crane carriers. The carriers, ranging in capacities from 10 to 35 tons, are designed for use in carrying cranes, power shovels, and other construction equipment. Another new line in production is the concrete transit-mixer chassis, including the "Mixer-Carrier" and the "Mixer-Master". ← (106)

● Advantages of the new ½-yd. single-engine, self-propelled crane, manufactured by Little Giant Crane & Shovel, Inc., include lower center of gravity, less tipping action, greater stability, lower maintenance cost, and one-man operation. It is adaptable for handling products in prestressed concrete casting beds. This crane is equipped with hydraulic servo steering and hydraulic power braking. ← (107)



● Fellowcraft Engineering Corporation is now producing a complete line of "Herculite" tarpaulins and coverings for concrete curing. Designed to combat the problems encountered in the curing of concrete pipe and forms, the tarpaulin, which has a special plastic covering over strong nylon fabric, is said to cut curing time in half. ← (108)

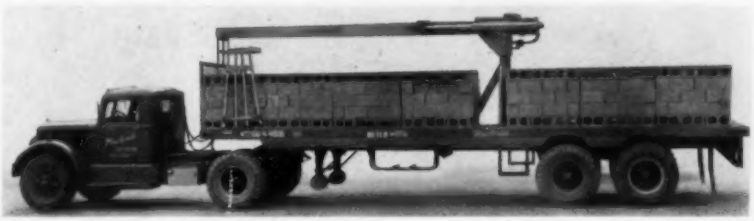


● Model "G" pallet loader, manufactured by the Lamson Corporation, provides a completely automatic pallet loading system for the plant which has a moderate production rate. The loader is designed to handle pallets up to 48 by 48 in., and can be loaded with pallets one at a time or in stacks. ← (109)

SIDE-O-MATIC

UNLOADS

- OFF SIDES AND REAR
- INTO BASEMENTS
- OTHER TRUCKS



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The Michigan Silo Company
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Jacksonville, Florida

M. L. Dague Company
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Pick's Pack-Hauler
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Elyria, Ohio—4 units

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Peoria, Illinois

Bestone Incorporated
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Putnam Mason Supplies, Inc.
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Columbia Concrete Products Co.
Des Moines, Iowa

Park Avenue Cement Block Co., Inc.
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Daggett's Concrete Products
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Fairlawn Supply and Coal Company
Akron, Ohio

Polyock Brothers
Zenda, Wisconsin

Atlas Concrete Products, Inc.
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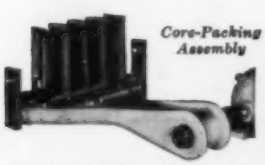
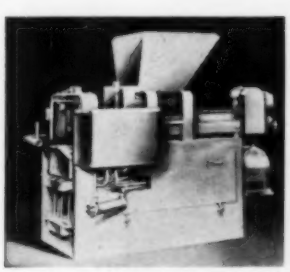
Lateral packing from around 300 square inches of packing area is augmented by the upward pressure, with the amount of squeeze adjusted to fit the kind of aggregate being used.

1-man operation . . . hydraulic movements . . . electrical controls. 2¼ tons of machine self-contained to occupy only 33 square feet of floor space.

Korpak machines are available on sale or lease-purchase. Write for descriptive catalog.



Core-Packing Assembly



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Manufacturers of Hydraulic Controls

MONARCH ROAD MACHINERY COMPANY

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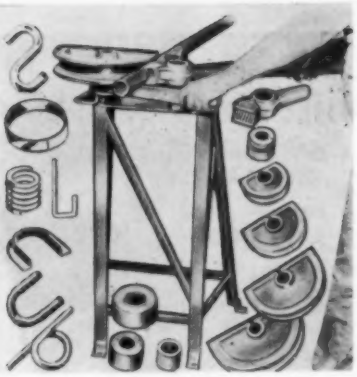
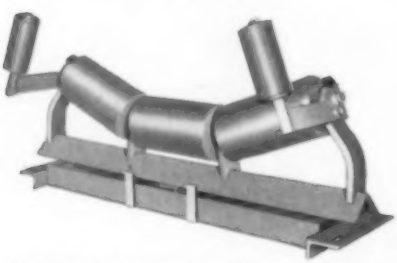
● Now available to the ready-mixed concrete industry is a new all-wheel drive carrier, the Oshkosh Model 18-34 6x6, which was designed and built by Oshkosh Motor Truck, Inc., to meet demands for a concrete carrier which could carry mixers of 5½-yd. or more capacity. Power steering and short wheel base assure greater maneuverability. Power on all three driving axles provide 6-wheel drive traction for on-and-off highway hauling and spotting loads anywhere, even under adverse conditions. (110)



● Four-in-one steel bar, rod, pipe, and tube benders, available from the J. B. Sebrell Corporation, are lightweight, versatile, and economical. They can be mounted on a work bench or metal stand, and can be mounted on a truck and carried from job to job. (111)

MARCO BELT CONVEYOR IDLERS
KEEP MATERIALS FLOWING SMOOTHLY AT LOWEST COST TO YOU...

M14 Standard Troughing Idler



M14T Self-aligning Troughing Idler

M14M Impact Troughing Idler

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These are the facts. And they all add up to the sound proof that MARCO offers you perhaps the finest, most complete line of ball bearing idlers available to American industry today.

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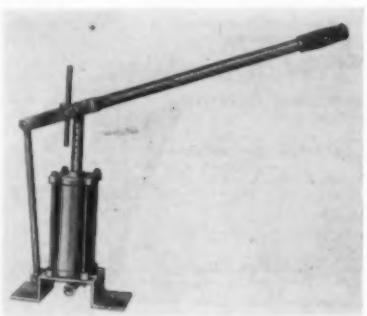

● Dispensers for handling air entraining agents used in construction are being manufactured by the General Equipment Company. The model shown above takes liquid from the original drum container and dispenses it in measured volume into the mix. This is a closed system under low pressure which permits transferring the air entraining agent from some convenient distance without spillage, messy handling, or congealing. (112)

● Newest in the line of cement placing and finishing equipment manufactured by the Creative Metals Corporation is this Cmetco power buggy. Features include automotive-type drive, easy ramp maneuverability, and compound transmission with built-in multi-disc double oil clutch. (113)

THE P & S ELECTRONIC MOISTURE CONTROL METER

CONTINUES TO GAIN NEW FRIENDS EACH MONTH

*T. M. Reg. U. S. Pat. Off.—Pats. Pend.

No human can control the moisture content of your mixes as perfectly as this scientific device.

- **MAKE *ONE* SAMPLE MIX, OF DESIRED CONSISTENCY**
- **SET THE DIAL TO THAT MILLIAMPERE READING**
- **JUST PUSH THE BUTTON FOR EACH MIX THEREAFTER**

The solenoid valve lets in EXACTLY enough water to duplicate the original mix

NO MORE CRACKED BLOCK FROM MIXES THAT ARE TOO DRY
NO MORE SLUMPED BLOCK FROM MIXES THAT ARE TOO WET

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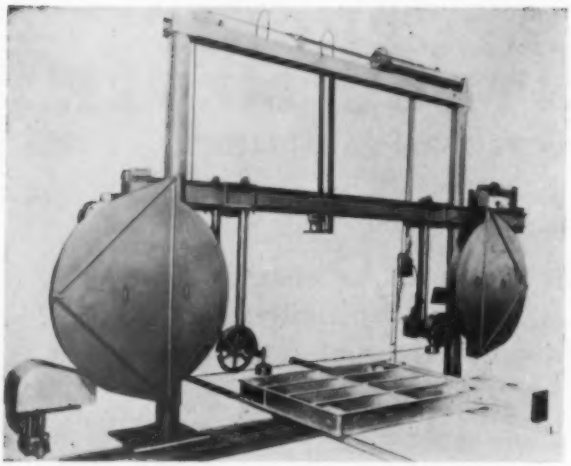
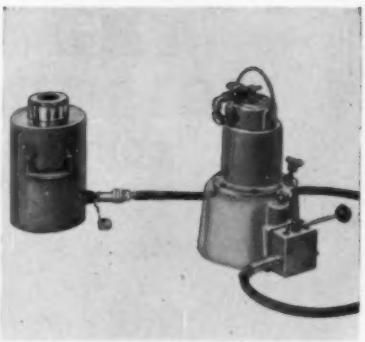


● The Gilco Shapecutter, a combination contour and straight cutting wire stone saw, is now offered by the L. M. Gilbert Company. The Shapecutter is a self-contained machine, easily erected, and quickly in operation. Cutting is accomplished by means of an abrasive mixture which is fed continuously to a rapidly moving steel wire. The wire drags the mixture across the stone to effect the cut. ← (114)



● A new air powered hydraulic pump, the No. P7A, has been announced by Templeton, Kenly & Company. The P7A, used with Simplex "Re-Mo-Trol" rams, provides combination units with capacities from 10 to 600 tons, and is said to lift seven times faster than a hand pump. The unit is applicable to uses in the prestressed concrete field for stressing reinforcing strands. ↑ (117)

● The "Hydrahoist", a new truck body made by the Russell Manufacturing Company, mechanizes loading and unloading operations through the use of hydraulic power activated by the truck engine, making possible reductions in the cost of hauling blocks, bricks, stone, and many other industrial materials. A lightweight superstructure and adjustable cables for lifting and moving are among its many features. The open framework permits loading by fork lifts at either side or at the rear. ← (115)

● A completely combustible propellent now used with Spray in the pressurized can has been developed by the Spray Starting Fluid Company. The new propellent is said to spray effectively in temperatures as low as 65 deg. F. below zero, and is completely safe in storage. ↑ (118)

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Precision-Perfect
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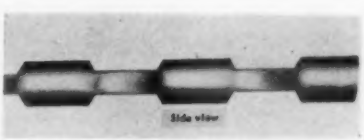
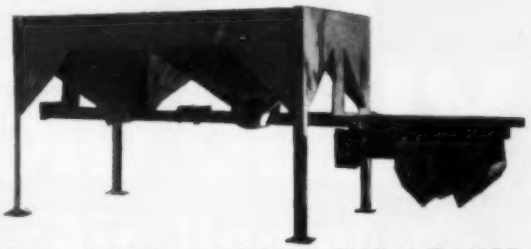
● Star Expansion's "Loxin" machine bolt expansion shield can be used to install pipes, ornamental iron work, conveyor systems, and as a general purpose expansion shield. Made in both long and short standard sizes, the short length gives sufficient holding power in firm masonry and the long size is suitable for softer materials. The shield is made of two sections assembled with a tapered nut in the base. As the bolt is tightened, the nut is drawn up, forcing the sides of the Loxin outward. The greater the load, the greater the expansion. .The Loxin shield remains expanded tightly once it is set in place, and cannot be disturbed although the bolt may be frequently removed. It is not necessary to bottom a Loxin in the hole in order to expand it properly; therefore, the depth of the hole does not have to be properly gauged as long as it is deep enough. ↑ (116)



● Blok-Mesh swedged reinforcing for masonry wall construction, made by The Carter-Waters Corporation, gives added resistance to lateral pressures and shrinkage. Blok-Mesh is deformed by swedging, resulting in a continuous line of horizontal and vertical surfaces where the mortar seats to provide maximum bond. The deformations are large and well-defined to form effective dovetailing, yet require no more area in the joint than other superficial deforming. Although the swedged surface of Blok-Mesh has many corners and edges, it is easy to handle. ↑ (119)

14 Tons Capacity
ONLY 7'-8"
CHARGING HEIGHT



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MOVE CEMENT WET OR DRY
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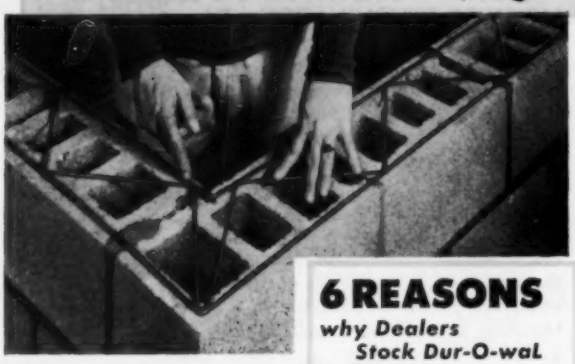

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It includes:

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2. AUTOMATIC BATCHING SCALES FOR PLANTS OF ALL SIZES. Uses $(SC)^2$ compensation discs to compensate for moisture content. This, with the automatic moisture determination, enables the operator to deliver the dry weight of wet aggregates and total water to a tolerance of 1/4%. which means slump control to less than an inch. One push button starts the batching which proceeds automatically to completion. It is simple, fast and accurate. Available for automatic, semi-automatic and manual operation.

3. AN AUTOMATIC GRAPHIC RECORDER that records the delivered weights of aggregates, water and cement on a single chart 12 inches wide, using different colored inks for aggregates and cement.

This set-up saves on cement and excess yield and increases sales.

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SCIENTIFIC $(SC)^2$ CONCRETE

New Literature

The Vermiculite Institute has revised its 12-page booklet, *Standard Specifications for Vermiculite Plaster and for Vermiculite Acoustical Plastic,* to include new provisions of the American Standards Association Specification for Gypsum Plastering. A new section on machine-applied vermiculite plaster has been added, and the specification for vermiculite acoustical plastic has been completely revised to include machine application. **(120)**

Current trends in the design and construction of prestressed concrete tanks are discussed in a new technical bulletin, available from *The Preload Company, Inc.* Illustrations of typical tanks and standpipes are included. **(121)**

The NF60, a new Rinson fork lift truck designed to fulfill the requirements of heavy construction materials handling, is being manufactured by *Rinkin & Olson.* An important advantage of the NF60, is that it may be towed safely at highway truck speeds. Rugged construction and easy maneuverability are other features. **(122)**

The Zonolite Company is offering two brochures describing roof decks and roof insulation and floor-slabs and floor-fill made of lightweight Zonolite brand vermiculite. Zonolite vermiculite is fireproof, will not decompose, and is economical and permanent. **(123)**

Losorb, a new additive for moisture-proofing concrete and cement materials, is described in a new Picco bulletin recently published by the *Pennsylvania Industrial Chemical Corporation.* The bulletin gives the characteristics and applications and tells of the advantages of using Losorb in concrete blocks, mortar and plaster, stucco, concrete farm silos, and concrete in industry. **(124)**

The $(SC)^2$ system, devised by the *Scientific Concrete Service Corporation,* provides a quick and accurate means of compensating for moisture present in materials, making it possible to produce batch after batch of concrete in which the variation in water content will not exceed 1/4 of 1 percent or 1 gallon per cubic yard. **(125)**

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2 Block Lith-I-Bar Machine 1951 Model in good running condition with off-bearer. Practically rebuilt. With spare parts.

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Eastern Representatives of the
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1951 GMC H-723	$4000
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Besser Vibrapac with Bergen front pallet feeder
Reasonably Priced
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May be seen at William F. Koenig Company, Cincinnati, Ohio
Being replaced by a GOCORP "Trustee" block machine
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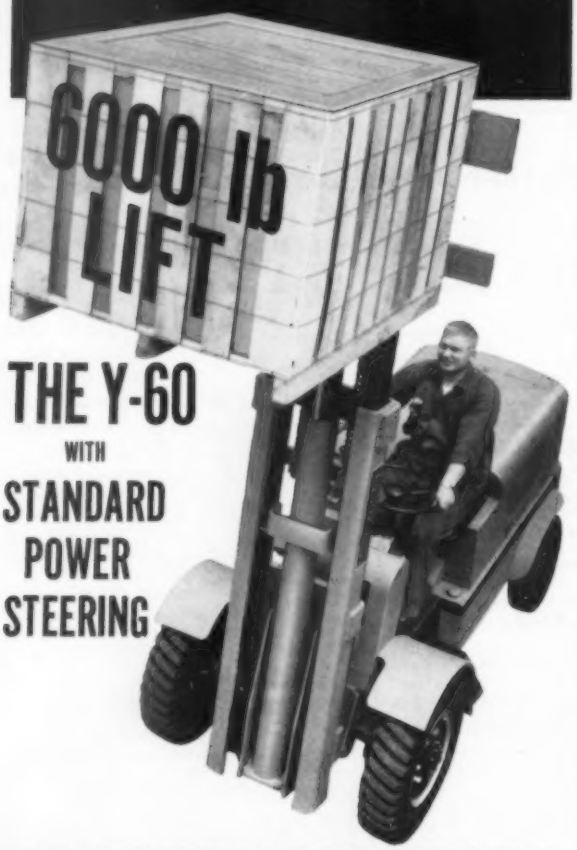

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Concrete Manufacturer

INDEX TO ADVERTISERS

A A Wire Products Co. 288
American Clay Machinery Division, Huber-Warco Co. 293
Andrews Machine Co. 290

*Bergen Machine & Tool Co., Inc. 309
*Besser Manufacturing Co. 276, 289, 316, 327, 349
*Bin-Dicator Co. 278
*Butler Bin Co. 338

C & W Sales Co. 284
Carpenter Mfg. Co. 341
Carter-Waters Corp. 332, 333
Chase Foundry & Mfg. Co. 337
Cinder Shippers 347
Classified Section 345-347
Cleaver-Brooks Co. 273
Columbia Machine Works 287
Concrete Controls Co. 280
Concrete Machinery Co., Inc. 341
*Construction Machinery Co. 352
Cook Bros. Equipment Co. 285
Cook & Ingle Concrete Products Co. 351

Darden Industries, Inc., Roy 341
Des Moines Glove & Mfg. Co. 349
Dunn Mfg. Co., W. E. 339
Dur-O-wal 343

Edick Laboratories 325
Elastizell Corp. of America 279
Erickson Power Lift Trucks, Inc. 337
*Erie Strayer Co. 356

*Fleming Mfg. Co. 328
Food Machinery & Chemical Corp. 321
Forney's, Inc. 324

General Engines Co., Inc. 346
GO Corp. 357
Gwynne, Inc., J. H. 343

Heltzel Steel Form & Iron Co. 331
Hoffmann Co., Geo. W. 346
Holiday Hill of America, Inc. 313
Huber-Warco Co. 293
*Hyster Co. 355

International Harvester Co., Motor Trucks 300

Jaeger Machine Co. 294-295

Kent Machine Co. 281

Lone Star Cement Corp. 272

*See also Detailed Information in 1956 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK

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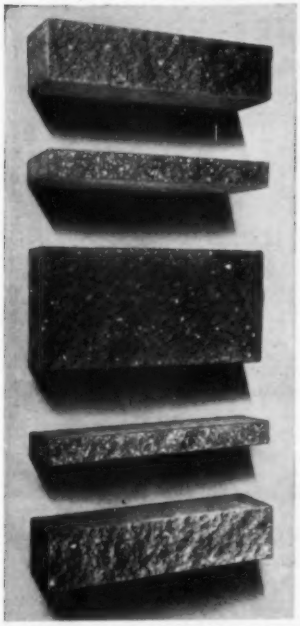

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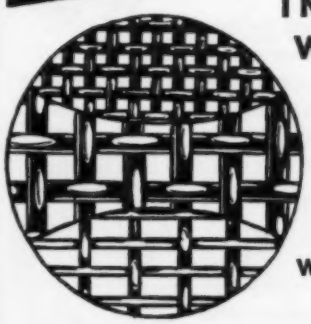

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Marsh Engineering Co., E. F. 340
Martin Engineering Co. 343
Monarch Road Machinery Co. 339

National Conveyor & Supply Co. 335
National Wire Cloth Co. 349
Noble Company 274

Olsen Corp., Gene 357
Oswalt Engrg. Service Corp. 337

Penn-Dixie Cement Corp. 283
Portland Cement Assn. 350
PreCaster, Inc. 282

Quinn Wire & Iron Works 330

Radio Corporation of America 301
Reichard-Coulston, Inc. 316
Richmond Fireproof Door Co. 323

Sarasota Engineering Co., Inc. 351
Schield Bantam Co. 326
*Scientific Concrete Service Corp. 344
Side-O-Matic Unloader Corp. 339
Sitton Co., Philip 307
*Smith Co., T. L. 329
Spillman Co., R. L. 347
Standard Dry Kiln Co. 351
*Stearns Manufacturing Co. 358
Superior Pneumatic & Manufacturing, Inc. 345
Surety Rubber Co. 323

Texaloy Foundry Co. 347
Trinity Div., General Portland Cement Co. 323
Truck-Man Division, Knickerbocker Co. 348
Twin City Iron & Wire Co. 341

Unit Step Form Co. 342

Williams, Roger F. 341
Worthington Corp. 314-315

*See also Detailed Information in 1956 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK

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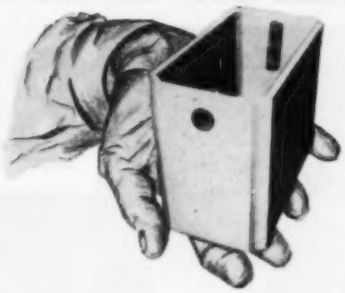

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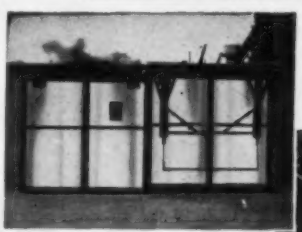

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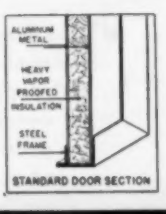

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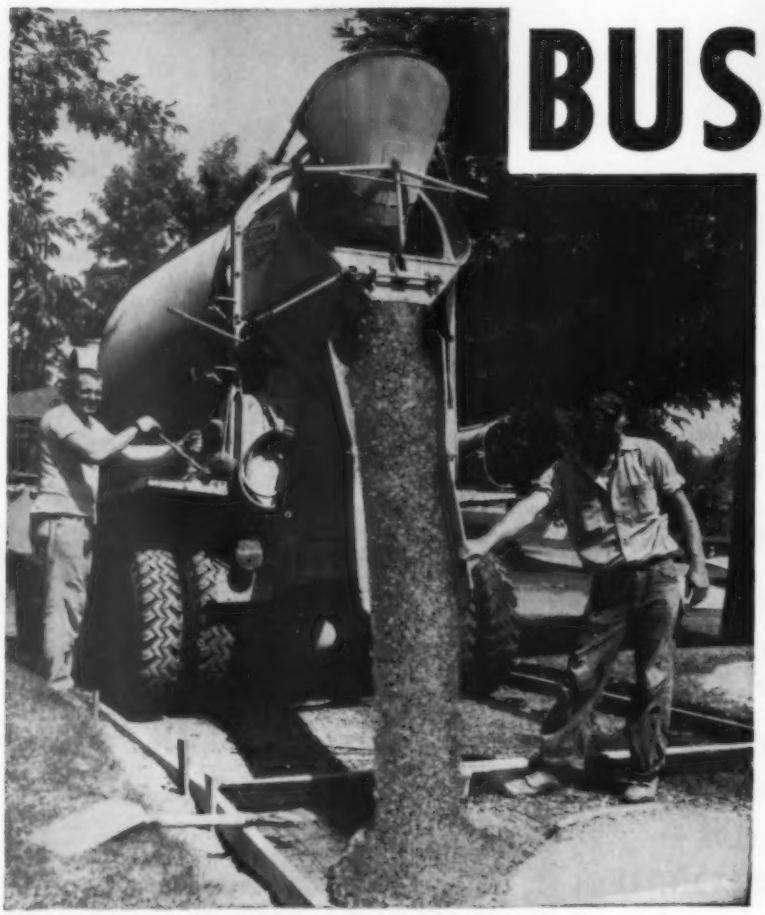

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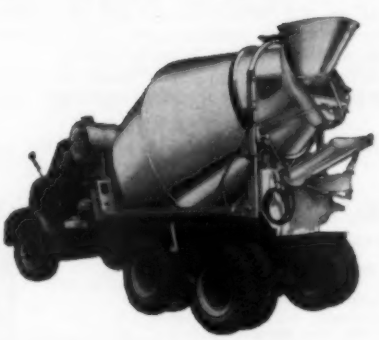

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The Concrete Manufacturer Index-Vol. 19

All major articles published in The Concrete Manufacturer during the 12-month period beginning with July, 1955, and ending with June, 1956, are here indexed under appropriate subject headings. Plant stories, general articles, and reports of association meetings are in most instances listed under the materials or products principally involved. Articles concerning particular phases of operations are listed under such headings as batching, safety, legal problems, et cetera.

ISSUE PAGE

AUTOMATION

GENERAL ARTICLES

Automation In Material Handling 6/56 211

BOOKKEEPING

GENERAL ARTICLES

Before the Year-End. Harold J. Ashe 11/55 251

CONCRETE MASONRY UNITS

PLANT STORIES

Cinder Block, Inc., Detroit, Mich., *Cinder Block, Inc.*, Roy L. Peck 5/56 292

Economy Block Co., Wauwatosa, Wis., *New Office Bldg. Shows Versatility of Block*..... 8/55 176

Josten Concrete Products Co., Sioux Falls, S. D., *South Dakota Block Producer Keeps Pace With Demand.* Buren C. Herod..... 12/55 192

Clyde J. Keys Industries, St. Petersburg, Fla., *Keys Industries of St. Petersburg*..... 11/55 240

Modern Crete, Inc., Flint, Mich., *Concrete Wall Panels*..... 9/55 230

Schuster Block Co., Indianapolis, Ind., *New Schuster Plant Rises from Ashes in 90 Days.* Roy L. Peck 8/55 163

Thorold Concrete Block Co., Hamilton, Ont., *New Canadian Block Plant Has Modern Design, Purpose.* Buren C. Herod 12/55 186

V. Paturzo, Bro. & Son, Inc., Baltimore, Md., *Baltimore Gets First Autoclaves.* Roy L. Peck.. 5/56 270

GENERAL ARTICLES

Concrete Block Houses Stand Up Under Terrific Atomic Blast Test 7/55 254

Lightweight Structural Concrete. E. L. Howard and W. E. Maulton 10/55 164

Recent Changes In Practice In High-Pressure-Steam Curing Systems. William J. Shore..... 11/55 253

Block Industry Passes Two-Billion Mark — Producers Expect 1956 to be a Better Year. Roy L. Peck 1/56 286

A Block Producer Talks to the Architect. George Kogel..... 1/56 288

Interesting Effects Obtained by Shadowall Concrete Units..... 3/56 210

Modern Curing of Concrete Block. Morris H. Gross..... 3/56 223

How to Get Workability in Lightweight Concrete 3/56 230

Conventional Curing of Block—Typical Questions Answered. Morris H. Gross..... 4/56 246

How to Reduce a Delivery Hazard—Block Spillage 3/56 254

Packaging and Job-Site Handling of Concrete Masonry Units. Paul F. Bronson..... 5/56 258

Joint Reinforcing in Cavity Wall Concrete Masonry Construction 5/56 288

ASSOCIATION MEETINGS

Autoclave Building Products Assn., *Autoclave Building Products Assn. celebrates 50th Anniversary.* Roy L. Peck..... 6/56 194

National Concrete Masonry Assn., *36th Annual Convention of N.C.M.A. Attracts Record Off-Year Crowd.* Roy L. Peck..... 3/56 234

National Concrete Products Assn., *Canadian Concrete Products Men Hold Seventh Annual Convention.* Roy L. Peck..... 4/56 236

Texas Concrete Masonry Assn., *Southeastern, Texas Block Makers Hold Joint Session.* Roy L. Peck 1/56 268

CONCRETE PIPE

PLANT STORIES

Formigli Brothers, Inc., Berlin, N. J., *Formigli Brothers And Prestressing.* Roy L. Peck..... 12/55 168

Illinois Prestcrete Co., Plano, Ill., *Pipe Process Used to Make Prestressed Floor System.* Roy L. Peck 10/55 167

Neville Concrete Pipe Co., Pittsburgh, Pa., *Pipe Firm Adds Precast Concrete Roof Tile Plant* 9/55 226

GENERAL ARTICLES

Concrete Pipe — a Consultant's Viewpoint. Miles N. Clair..... 10/55 176

Concrete Pipe Rides Construction Trend Upward in 1955. Roy L. Peck 1/56 312

ASSOCIATION MEETINGS

American Concrete Agricultural Pipe Assn., *Irrigation, Drainage Discussed at 5th A.C.A.P.A. Convention* 7/55 270

American Concrete Agricultural Pipe Assn., *6th Annual Convention of A.C.A.P.A. Concrete Pipe Makers discuss irrigation, concrete control, testing at Denver meeting* 6/56 203

American Concrete Pipe Assn., *Fifth Annual A.C.P.A. Short Course Attracts U.S., Canadian Producers* 1/56 264

American Concrete Pipe Assn., *48th Annual A.C.P.A. Convention Features Discussions on Quality, Industry Needs*..... 5/56 287

Western Concrete Pipe Assn., *Western Concrete Pipe Men Hold 36th Annual Meeting*..... 7/55 256

EDITORIALS

The Cement Shortage..... 7/55 247

E Pluribus Unum..... 8/55 147

Fire Is Your Business..... 9/55 213

Safety Needs You..... 10/55 153

Automation 11/55 217

Important Conventions Ahead!.. 12/55 153

Let's Get Behind and Push..... 1/56 249

Ready-Mix and Precasting..... 2/56 153

Glass Houses — and Thrown Stones 3/56 203

Cement—Storage and Price Security 4/56 195

A Warning—and a Suggestion.. 5/56 249

A Boy Comes of Age..... 6/56 177

LIME

PLANT STORIES

Fischer Lime & Cement Co., Memphis, Tenn., *Fischer Lime & Cement's New Lime Putty Plant A Compact Unit.* Roy L. Peck.. 7/55 263

MEN OF INDUSTRY

President Earl W. Peterson.... 1/56 257

MISCELLANEOUS CONCRETE PRODUCTS

PLANT STORIES

SEPTIC TANKS

Cradle Tile Co., Opa-Locka, Fla., *Cradle Tile Has Bright Future in Septic Tank Drain Fields*..... 10/55 179

M. S. Eisenhart, Inc., York, Pa., *Versatile Septic Tank Facility.* Roy L. Peck..... 12/55 180

GENERAL ARTICLES

Increased Use of Color Seen in Concrete Industry. Frank D. Davis 8/55 168

Etymologically Speaking Will It Ever End? 9/55 244

Benefits of Using Calcium Chloride in Concrete Products. William E. Dickinson..... 2/56 190

Prestressing — A New Age in Concrete. H. H. Edwards..... 3/56 248

ASSOCIATION MEETINGS

American Concrete Institute, *Concrete Institute's Southeast Meeting Features Latest Construction Methods* 12/55 198

American Concrete Institute, *A.C.I. Convention Approves Revised Building Code*..... 4/56 242

Mid West Concrete Drain Tile Manufacturers, *Concrete Drain Tile Makers Meet at Purdue University* 3/56 252

Prestressed Concrete Institute, *Prestressed Concrete Institute Draws Large Attendance At First Annual Meeting*..... 7/55 258

Unit-Step Assn., *Unit-Step Association Plans To Hold Third Annual Convention* 12/55 165

PORTLAND CEMENT

GENERAL ARTICLE

Cement Industry Expanding Rapidly—Capacity Increased 5 Percent in 1955—13 percent increase expected in 1956. Walter E. Trauffer 2/56 176

PRESTRESSING

PLANT STORIES

Formigli Brothers, Inc., Berlin, N. J., *Formigli Brothers and Prestressing.* Roy L. Peck..... 12/55 168

Illinois Prestcrete Co., Plano, Ill., *Pipe Process Used to Make Prestressed Floor System.* Roy L. Peck 10/55 167

Capital Concrete Co., Jacksonville, Fla., *Florida Prestressing Plant Utilizes Modern Technique In New Central Casting Yard*.. 6/56 216

The Concrete Manufacturer Index-Vol. 19

ISSUE PAGE

GENERAL ARTICLES

Prestressing—A New Age In Concrete. H. H. Edwards..... 3/56 248
World's Longest Highway Bridge. R. O. Kasten..... 6/56 198
Trends in Pre-Tensioned Concrete Roof Members. H. H. Edwards 6/56 202

ASSOCIATION MEETINGS

Prestressed Concrete Institute, *Prestressed Concrete Institute Draws Large Attendance At First Annual Meeting*..... 7/55 258

PROMOTION

GENERAL ARTICLES

Some Suggestions for Getting Better Results From Telephone Directory Ads. Ernest W. Fair 8/55 173
Capturing Good Publicity For Your Business. David Markstein 10/55 182

READY MIXED CONCRETE

PLANT STORIES

Anderson-Dunham, Inc., Baton Rouge, La., *Anderson-Dunham, Inc.—Dominant Louisiana Concrete Producer.* Roy L. Peck... 4/56 252
John A. Denie's Sons Co., Memphis, Tenn., *Memphis Ready-Mix Producer Converts to Propane Gas.* Carl Abell..... 6/56 206
Daniel Dixon Co., Cross Roads, Calif., *Ready-Mix Venture Prospers in Tiny California Desert Town.* Harry F. Utley..... 4/56 209
Evans, Coleman and Evans, Ltd., North Vancouver, B.C., *Automation in Material Handling*... 6/56 211
Fort Worth Sand & Gravel Co., Fort Worth, Tex., *Radio and Ready-Mix Operations* 8/55 161
Walt Keeler, Inc., Wichita, Kans., *Walt Keeler of Wichita*..... 9/55 236
Material Service Corp., Chicago, Ill., *Radio and Ready-Mix—Material Service Corporation Equips Large Fleet with Two-Way Units.* Roy L. Peck..... 2/56 170

GENERAL ARTICLES

Production and Value of Ready-Mixed Concrete in 1954. Kenneth E. Tobin, Jr..... 7/55 268
Ready-Mixed Concrete Industry Shows Normal Annual Gain. Roy L. Peck 1/56 281
Ready-Mix and Precasting. Roy L. Peck 2/56 153
Admixtures for Ready-Mixed Concrete. Delmar L. Bloem..... 5/56 302
Color in Ready-Mixed Concrete. Frank D. Davis and F. W. Drury, Jr. 6/56 214
RX—Ready Mix. Harry F. Thomson
Cement Storage—A Continuing Problem 7/55 252
Plant Inspection for Quality Production 8/55 157
Winter Operation May Be Tricky 9/55 222
Size of Truck-Mixer Loads... 10/55 162
Standard Specification Often Ignored 11/55 230
Full Strength Requires Moist Curing 12/55 164
Verify Quality of Fly Ash Before Using 1/56 266
Role of Fly Ash in Precast Products 2/56 165
Cement Types and Blends Deserve Consideration 3/56 219
Many Producers Could Improve Production Details..... 4/56 212
Contributions of Ready-Mix to the Building Industry..... 5/56 268
Draining Sand Helps Control 6/56 190

ASSOCIATION MEETINGS

Florida Concrete & Products Assn., *Block and Ready-Mix Men Form Florida Association*..... 8/55 154
Midwest Ready Mixed Concrete Assn., *Labor Relations, Quality Control Discussed at Annual Meeting of Midwest R.M.C. Association.* Roy L. Peck..... 5/56 280
National Ready Mixed Concrete Assn., *Successful N.R.M.C.A. Board Sessions Well Attended at Hot Springs.* Walter E. Trauffer 11/55 242
National Ready Mixed Concrete Assn., *N.R.M.C.A. Holds 26th Annual Convention* 4/56 214
Ohio Ready Mixed Concrete Assn., *Ohio Ready-Mix Producers Discuss Credit, Legislation, Labor at 17th Meeting*..... 8/55 171

SAFETY

GENERAL ARTICLES

How Safe is Your Plant?..... 11/55 258
Winners of Second N.C.M.A. Safety Contest Announced..... 2/56 182

SAND AND GRAVEL

PLANT STORIES

Anderson Sand and Gravel Co., Saginaw, Mich., *Anderson Sand and Gravel.* Roy L. Peck..... 11/55 233
Fischer Lime & Cement Co., Memphis, Tenn., *Fischer Lime & Cement's New Lime Putty Plant—A Compact Unit.* Roy L. Peck 7/55 263
Livingston Rock & Gravel Co., Los Angeles, Calif. *Livingston's Metropolitan Batch Plant Serves Downtown Los Angeles.* Harry F. Utley 2/56 174

TECHNICAL SOCIETIES

American Concrete Institute, *Concrete Institute's Southeast Meeting Features Latest Construction Methods* 12/55 198
American Concrete Institute, *A.C.I. Convention Approves Revised Building Code*..... 4/56 242

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Every issue of PIT AND QUARRY is full of information you can use in your business. It gives you ideas on every phase of your operations.

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Hyster 60 with power steering and multiple forks handles pipe in sizes 4" to 36", also manholes, septic tanks, splash boxes and pier blocks. Operation is over unpaved yard and rough ground.

Pictured above is one of many typical examples of how Hyster® Industrial Trucks are helping to effect tremendous savings in the cost of handling Concrete Products.

Even if you are now using lift trucks or have never used industrial trucks of any kind, your Hyster dealer can show you how you can quickly realize more profit from your operation with these multi-purpose utility tools. Your Hyster dealer knows materials handling . . . he is an expert on the problems and their solution. He can help you with special techniques and cost reducing methods. Call him today...why not take advantage of his materials handling know-how? He is listed under "Trucks-Industrial" in your telephone directory.

HYSTER DEALERS GIVE YOU ALL 3!

1 **PLANNING**—your Hyster Dealer will plan your materials handling operation from scratch, or will analyze your present system to see if it can be improved.

2 **THE RIGHT TRUCK**—for *your* job from Hyster's complete line of industrial trucks (1,000-30,000 lbs.) and over 100 job-attachments for economical load handling.

3 **THE RIGHT SERVICE**—ample spare parts stock, shop facilities, factory-trained mechanics and an efficient field service that keep your Hyster lift trucks going on your job, wherever your job might be located. Hyster trucks are noted the world over for their low downtime.

Materials Handling Trucks from 1,000 to 30,000 pound capacities

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FOUR FACTORIES: Portland, Oregon; Danville, Illinois; Peoria, Illinois; Nijmegen, The Netherlands.

HYSTER

HYSTER COMPANY

"WE CONSIDERED MANY PLANTS WE *CHOSE* AN ERIE AUTOMATIC BATCHER"

● REPORTS CLINTON KELLER, VICE-PRES. READY-MIX CORP. OF COLORADO SPRINGS

It takes some real doing to make a decent profit in the highly competitive ready-mix concrete business. You can turn out good specification concrete and still lose your shirt—unless top-quality goes hand-in-hand with efficient, high-volume production.

Ready-Mix Corporation took a long, hard look at these facts before buying a concrete batching plant. They selected the Erie plant, shown above, with AUTOMATIC controls for batch CEMENT AND AIR OPERATE GATES FOR AGGREGATE.

Here's what company officer, Clinton Keller, says about their fast working ERIE Truck Mixer Plant. "After considering a number of plants, we decided on an ERIE. We felt it would give us more concrete, faster, and would require fewer men to operate. Our ERIE plant has been in operation several months now. It's everything we thought it would be. We're highly pleased!"

Plus Features ERIE PLANT Provides

1. One-man operation for efficient, profitable production.
2. Faster batching and discharging cycle with free flow of materials from bins to batcher.
3. Choice of controls from either mechanical or from proven electronic batching with mechanical option.
4. Precision Batchers for weighing and mixing concrete that easily meet highway department specifications.

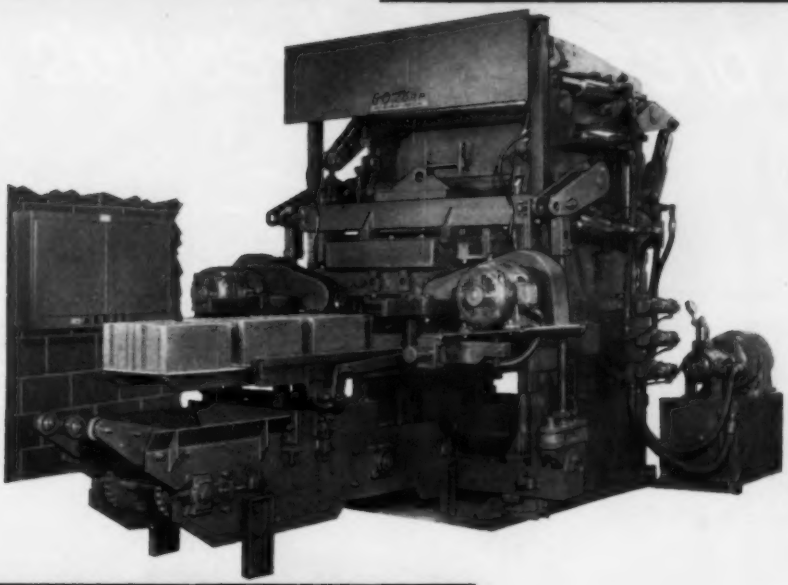
Write for catalogs, Dept. C76

ERIE STRAYER COMPANY

376 GEIST RD., ERIE, PENNSYLVANIA

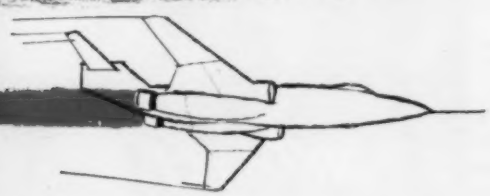
HIGH PRODUCTION 2x and 2½x LOW COST

NEW!



NEW!

WITH THE GOCORP *jet*



Here's a low cost, *durable*, plain pallet block machine that will give you jet age production of blocks you can brag about. The JET builds profits for you that won't be eaten up by maintenance and the burden of frequent replacement.

JET FEATURES THAT MEAN PRODUCTION AND PROFIT!!!

- **JET PRODUCTION**—Conservatively rated at 600 good blocks per hour.
- **JET QUALITY BLOCKS**—Quick change feed and strip time controls to handle troublesome mixes • Automatic, low voltage height control • A block receiver that babies your most fragile blocks—no jolts or jerks.
- **JET HYDRAULIC DRIVE**—For swift, smooth, effortless motions.
- **BUILT TO LAST**—Rugged frame has full 1" side plates—thoroughly braced with plate and structural members • Motors, pumps, shafts, single acting cylinders are all oversized for real staying power • Plug stop reversing vibrator motors—no brake failures.
- **ACCESSIBLE**—Working parts are where you can get at them • No pit required • Easy to adjust • Easy to clean • Easy to maintain • Change full height molds in about 20 minutes—to other heights in about 30.
- **TWO VERSATILE SIZES**—Either 2X or 2½X.

For higher production at a lower unit cost, write today for your brochure on the GOCORP JET.

OTHER GOCORP EQUIPMENT—The "Trustee" (3X husky brother of the "Jet"), "King" (6X) and "Senior" (3X) Plain Pallet Machines • "Junior" Cored Pallet Block Machines (Single or Twin Models) • Mixers and Skips (up to 75 cu. ft.) • Allied equipment.

GOCORP
ADRIAN-MICH.

454 Grace Street Adrian, Michigan

D Tournapull is built to stand up under the toughest working

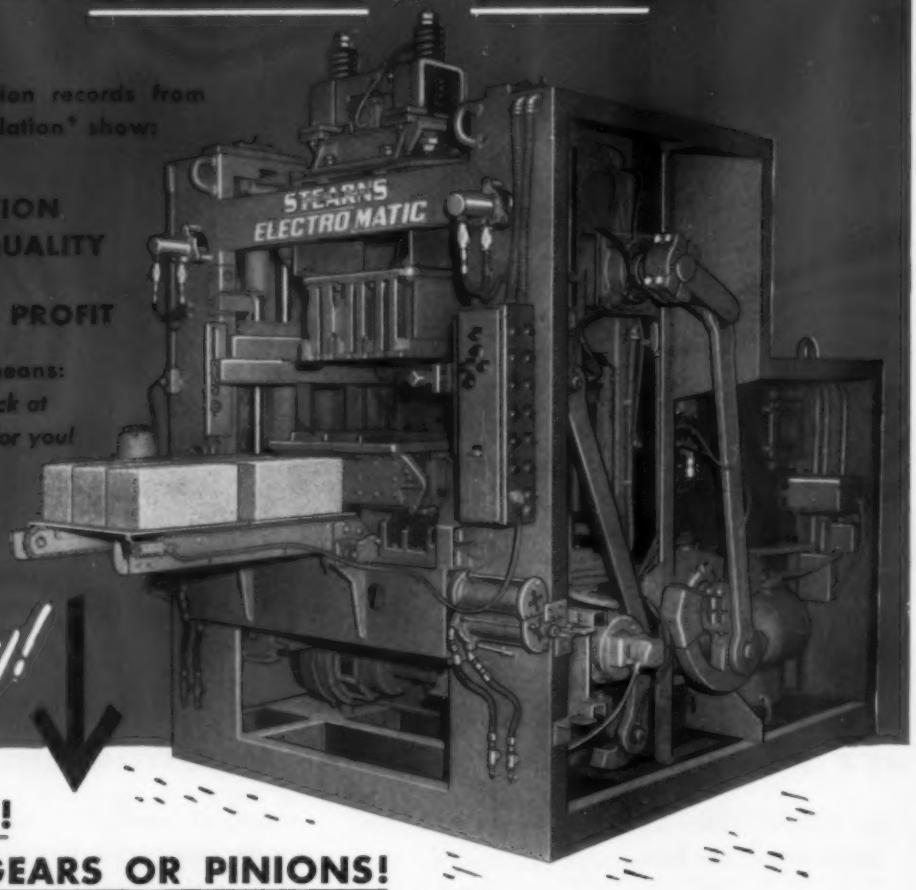
The STEARNS ELECTRO MATIC is breaking all records!

FOR... PRODUCTION and QUALITY

Actual production records from the latest installation* show:

★ HIGHER PRODUCTION
★ BETTER QUALITY BLOCK
★ GREATER PROFIT

Which simply means: *More quality block at lower unit cost, for you!*



...and here's why!

NO CAMS!

NO OPEN GEARS OR PINIONS!

The newest *proven* concept of power application in block machines for *faster* cycling.

Individual, motor driven, enclosed gear units, provide crank controlled harmonic motion to all functional machine movements, for rapid acceleration and deceleration, and smooth sequence operation. Gear units are interchangeable, with gear running in sealed oil bath for trouble-free operation and service . . . slashes maintenance costs! UNIFORM COMPACTION IN ALL COMPARTMENTS with Stearns unidirectional dual shaft vibration, stationary mounted, with TWIN 7½ HP 3500 RPM motors. The ELECTROMATIC can be easily converted to 12 inch, or 4 inch high units . . . added protection on your investment, for the growing specialty market. Write today for full information.

*Location furnished upon request.

STEARNS
MANUFACTURING COMPANY • INC.
ADRIAN, MICHIGAN, U.S.A.

COMPLETE CONCRETE PRODUCTS PLANT EQUIPMENT

D Tournapull is built to stand up under the toughest working conditions. Box-beam principle gives structural members extra strength while reducing weight.

There is nothing to twist out of alignment. Construction of push-block is typical: Steel angles, rigidly braced and welded, give you a push-block ruggedly built to take the hardest loading shocks... yet it's light in weight.

Moves more yards...

costs less to own, less to operate...

than bigger, slower crawler combinations

One of the big advantages of D Tournapull as a "handyman" dirt-mover for stripping overburden or other mine scraper assignments is the simplicity and economy of servicing and repair. Not only is the original price of this 7½-yd. "D" less than a medium-sized crawler-tractor and scraper, but it's less expensive to operate and maintain. Its high-speed cycles make it competitive in production with much larger crawler-scraper combinations.

Tournapull prime-mover and scraper each tilt independently up to 30° through a vertical and horizontal king-pin arrangement.

Arc-welding and box-beam and channel construction, strongly gusseted at points of intersection, minimize deadweight without sacrificing strength. There are no bolts or rivets to add excess weight.

Moving parts have been held to a minimum. This not only cuts down weight, but also eliminates trouble spots that multiply as a machine becomes more complicated.

No hinged steering wheels

For example, you'll note we've eliminated the small front steering wheels of conventional rubber-tired haulers, and the hundreds of pounds of "hardware" that go with them. In their place "D" steers through a simple king-pin steering system. Operating controls are powered from the electrical system (which all haulers have anyway) and hydraulics and complicated power take-off systems are eliminated.

Use of electric motors places the power at point-of-action where it is needed. Heavy-duty electric conductor cables transmit power to motors instantly. There is no wear in these power lines as on hydraulic lines or mechanical linkage... no constant servicing is required.

Working parts protected

There are no projecting parts to be damaged by rocks, dirt, or other job hazards. Engine, drive, and steer components are under safe cover.

There are no open sprockets, chains, or linkage to wear. There are no long cable-lines with reverse bands, sheaves and mountings, no bulky hard-to-seal hydraulic systems.

All operating parts are machined from top-grade steels, properly heat-treated and stress-relieved for long wear. Every power-transmitting part, from engine to final drive, rolls on high-speed, oil-sealed, anti-friction bearings.

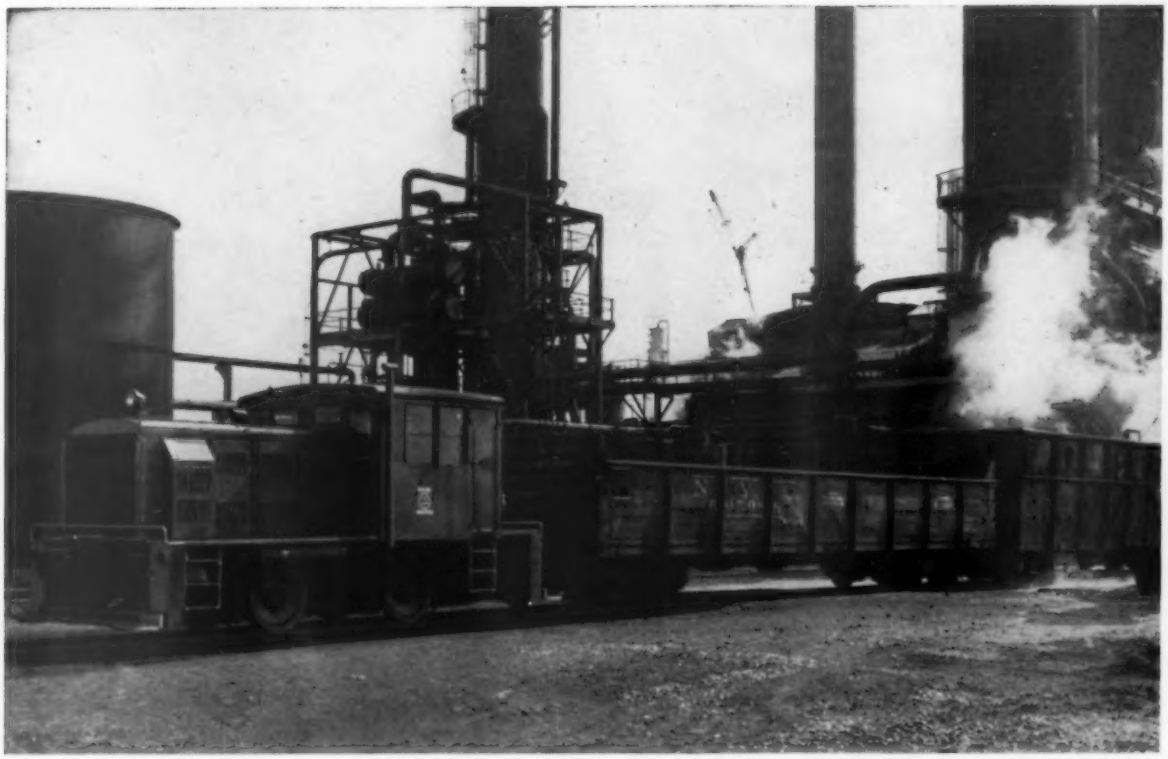
The D Tournapull is a fully developed machine proved by over 8 years of around-the-world pit service. Simple, rugged construction, perfected by experience, gives you the dependability you need for low maintenance and fast handling of scattered dirtmoving assignments.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-971-G-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



Second Plymouth Gives Repeat Performance with

CONTINUOUS SERVICE for CITIES SERVICE

at East Chicago, Indiana, Delayed Coking Unit

Past performance of a 22 year old Plymouth 25-ton locomotive was the selling point when Cities Service purchased a Plymouth 35-ton Diesel Locomotive in 1952. Larger scale operations demanded a larger locomotive and continuous service was very important. Delays in coking had to be only those planned in the process . . . not the unexpected kind that stopped the process causing loss of production and needless expense.

That's where Plymouth pays off! After three years on the job 56 hours a week, Cities Service's Plymouth has proved its ability to give continuous service. Routine maintenance has been done while the locomotive is waiting to move cars. Plymouth's well known efficiency and economy help make the operation profitable as well as continuous.

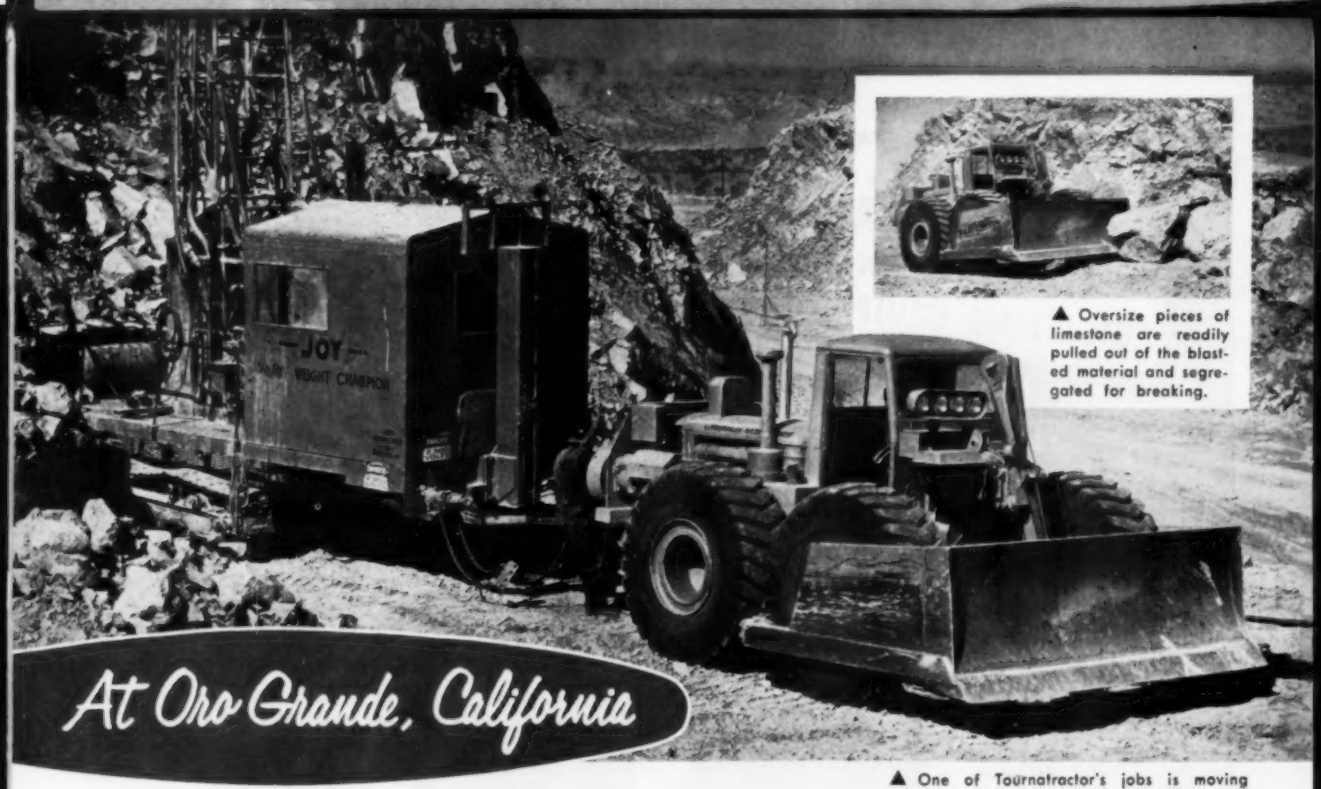
Steady service that is efficient and economical is available for your operation in Plymouth Locomotives from 3 to 70 tons. Gasoline or Diesel, mechanical or Torqomotive Drive.* Also Diesel-Electrics. Write for free catalog and specifications, to: PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-15, Plymouth, Ohio.

PLYMOUTH® TORQOMOTIVES

*TORQOMOTIVE DRIVE: Plymouth Transmission coupled to a Hydraulic Torque-Converter

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

A Subsidiary of Westinghouse Air Brake Company



▲ Oversize pieces of limestone are readily pulled out of the blasted material and segregated for breaking.

▲ One of Tournatractor's jobs is moving equipment. Machine easily and quickly tows this heavy drill from one blast site to the next.

One fast rubber-tired tractor takes over all quarry clean-up ... speeds production

In Riverside Cement Company's limestone quarry at Oro Grande, California, there are many scattered jobs that must be done quickly, without interference to production. These jobs include clean-up around quarry shovels, leveling waste dumps, dozing overburden, towing other equipment around the quarry.

To do this variety of jobs at its Oro Grande property, Riverside Cement Company, of Los Angeles, first tried a 150 hp, 5.8 mph crawler tractor. They found the machine too slow. It couldn't get around fast enough to do its varied assignments.

More work done in less time

Recently Riverside Cement Company purchased and placed in service a 19 mph, 208 hp, rubber-tired Tournatractor. With the increased speed and flexibility of this unit, Riverside finds that critical jobs can now be completed in less time than before; eliminating production delays, cutting costs.

Big rubber tires "cushion" shock

Working on rocky quarry floor, the big, low-pressure Tournatractor tires absorb shock, ride smoothly over rough going, with minimum "wear-and-tear" to operator and machine. And Tournatractor's powertrain is sealed against quarry dust and gritty materials. Lubricants are kept clean and free from abrasives, damage and wear to bearings and moving parts is prevented, maintenance time and expense is reduced.

Investigate Tournatractors

For fast, all-around mine and quarry duty, investigate the highly maneuverable Tournatractor. Let us send you some owner-verified reports on Tournatractor performance. Write for full details.

▲ Tournatractor's 19 mph speed handles shovel clean-up in a hurry ... cuts work delays ... increases daily output. Rubber-tired tractor "outruns" crawler 2-to-1.

▲ Air compressors, and other mine equipment, moved fast from one job location to another. Tournatractor gets *more* work done, *fast*, at *low operating cost*.

Tournatractor—Trademark Reg. U.S. Pat. Off. T-872-Q-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

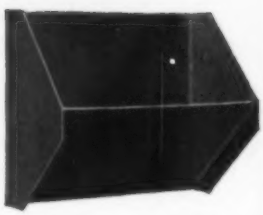
STANDARD

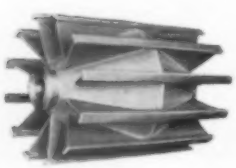
ELEVATING AND CONVEYING EQUIPMENT

•Greater Strength•
•Longer Life•
•Lower Cost•

CONTINUOUS ELEVATOR BUCKET STYLE No. 2

Put this Standard Bucket to work handling the toughest materials, and it takes the job right in stride—resisting abrasion, corrosion and wear. This bucket is typical of the complete line of low cost, rugged Standard Steel Buckets—available in Salem, Style "A," shelf type and other continuous style buckets.





STANDARD WING TYPE SELF-CLEANING PULLEY

The most severe operating conditions won't bother this Standard Pulley because its all-steel welded construction gives it far greater strength and resistance to breaking. And yet it weighs less . . . costs less.

STANDARD BIN GATE

Profit from faster, easier material handling made possible by this gear-operated all-steel Standard Bin Gate. Other styles in Standard Bin Gates also available.

For lower maintenance and material handling costs, convert to Standard. Write today for catalog showing the complete Standard line.

The Standard Metal Mfg. Co. Since 1921

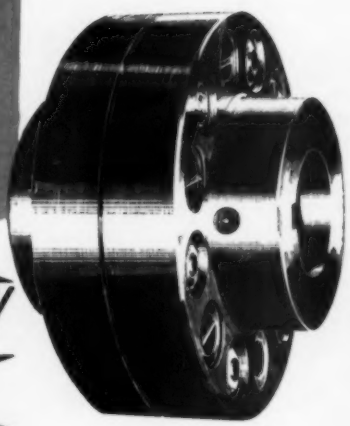
STANDARD METAL MFG. CO.
111 CENTER ST. MALINTA, OHIO

IT PAYS TO SPECIFY

AJAX

flexible couplings

when you order new equipment



The finest equipment deserves the finest couplings,—safeguard against destructive wear due to unavoidable misalignment. Always specify AJAX FLEXIBLE COUPLINGS when you order. Standard of the industry for over 30 years.

AJAX FLEXIBLE COUPLING CO. Inc.
WESTFIELD, N. Y.

Still Available!

NEWEST

PORTLAND CEMENT

PLANT MAP

This map shows the locations of all the portland cement plants and distributors now operating in the United States, Canada, Mexico, Alaska, Hawaii, and Cuba, plus those that will be completed in 1956. These plants are listed alphabetically, by state and city, so they can be located easily. Production capacity in barrels, types of process, and brand names of each firm's products are also shown.

The map is 34 by 40 inches and is printed in black and white on heavy, durable 60-lb. paper stock. Prices are as follows:

1-10 maps	$1.00 each
11-25 maps	$ .75 each
more than 25 maps	$ .50 each

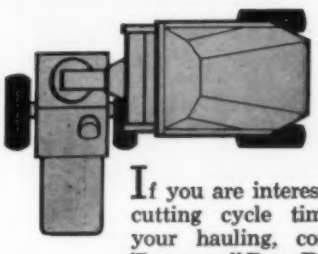
Please make your request for these maps on your company letterhead. Also, send along a check, cash or money order to cover the number of maps you wish to purchase.

PIT AND QUARRY PUBLICATIONS
431 S. Dearborn St. • Chicago 5, Ill.

90° turns . . .

give faster cycles and easier spotting

Tournapull Rear-Dump's short-turn radius saved construction of expensive turn-arounds in this 26′ wide, 165′ deep railroad cut. With body raised, as shown, "C" easily made non-stop U-turns within the narrow area.



If you are interested in cutting cycle time on your hauling, consider Tournapull Rear-Dumps.

These units make a non-stop U-turn by power steer in less than their own length. They eliminate time normally wasted shuttling back and forth to turn in narrow quarters. They also frequently eliminate skid-plates or expense involved in construction of special turn-around areas.

Where space is unlimited, 90° turnability still gives you faster cycles. At the shovel, fast-maneuvering Tournapull Rear-Dump swings in and positions quickly. Loading unit need not sit idle while hauler operator wastes time on a wide sweeping turn and then a long, slow back-in. Quick, safe spotting saves additional time on the dump.

Simplicity reduces maintenance

A great deal of the expense involved in maintenance is also eliminated because of the simplicity of the Tournapull turn mechanism. Steering involves only an electric motor connected to a ring gear and king-pin shaft. A flick of the finger activates the motor and causes prime-mover to pivot up to 90° around trailing unit. Turns are made quickly regardless of footing. There are no front steering knuckles, no reach rods, no complicated mechanisms to get out of line, maintain, or repair.

Now available with optional tailgate.

Check these and all the other advantages of Tournapull Rear-Dumps. See for yourself how they speed cycles and cut costs. Write or call any time for owner-verified production studies and specifications. There's no obligation.

Model	Capacity	HP	Overall Length	Width req'd. for 180° turn	
				Travel position	Dump position
D	11 tons	138	24′10″	24′8″	18′8″
C	22 tons	208	29′9″	28′8″	20′8″
B	35 tons	293	35′10″	35′	27′

These features, too, can help on your job

Hauls anywhere — Big single low-pressure tires let Rear-Dumps safely travel narrow haul roads, paved highways, city streets . . . haul cross-country over roughest terrain, through muck and soft fills.

Reduces maintenance — Because these Rear-Dumps have no jack lines, no long drive-shaft, no frame, sub-frame, springs or tie rods, most common troubles of conventional rear-dump haulers are eliminated.

Dumps fast, clean — Flick of switch activates hoist motor. Body lifts quickly to any desired angle for spreading on run. At full dump position, bowl-lip is behind rear wheels so dump can be made clean over bank. Streamlined body sheds material readily.

Cuts weather delays — Power-transfer differential automatically applies power to drive wheel on firmest footing . . . pulls unit through mud, sand, soft materials which stop ordinary haulers. It's a Tournapull exclusive.

Resists body shock, damage — Three-layer, all-steel, grid-type bowl with tool-steel floor resists loading shocks. Big, wide bowl opening is easy target for any loading unit.

Improves safety — Multi-disc air brakes have more braking surface on one wheel than most haulers have on all 4. Low center of gravity, good visibility, front-wheel drive, easy control all contribute to maximum safety.

Delivers full power — Torque converter (optional in C size) automatically balances load and torque so you get full horsepower always. Lugging is reduced; shocks in transmission and final drive virtually eliminated.

Reduces fatigue — Big low-pressure tires and air-foam cushion seat smooth out ride for operator. Electric push-buttons control power steer and 2-way power dump. Eliminated is all manual work of fighting balky levers.

Insures future earnings — Behind Tournapull prime-mover, you can interchange rear-dump with scraper, bottom-dump, crane, flatbed. These trailing units lower your investment, let you handle any future job efficiently, help you keep your Tournapull profitably busy the year-around.

Tournapull—Trademark Reg. U.S. Pat. Off. R-792-G-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

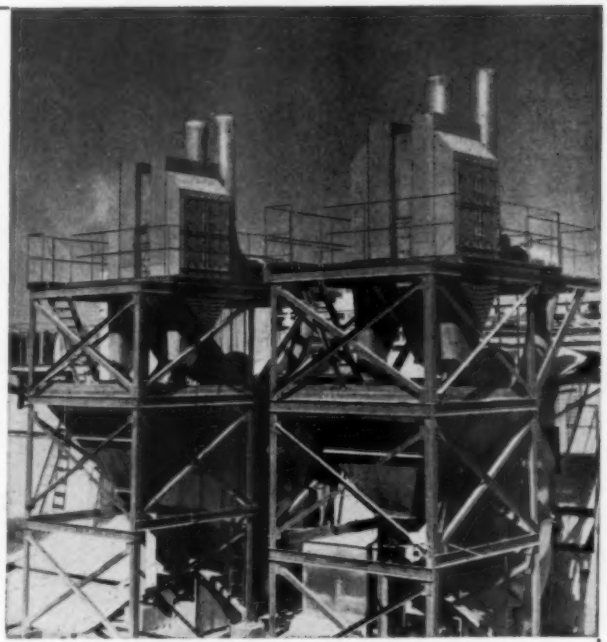
A Subsidiary of Westinghouse Air Brake Company

High Efficiency — Dry Collection of fines from 500°F Kiln Gases!

These two 177 tube D-450 Dustex collectors recover 2000 pounds of fines per day at the New England Lime Co., Adams, Mass. Each collector handles 13,000 cfm at 500°F with a 5" w.g. pressure drop. Gases are from rotary lime kilns burning de-dusted granulated limestone.

Installation of these two Dustex units was prompted by satisfaction with a previous Dustex installation on a Dorrco FluoSolids® System for drying and sizing limestone prior to calcination. This earlier collector attains remarkable efficiency on dust particles 100% below 17 microns, 40% below 1 micron.

We can prove *performance before purchase!* Write for a description of our simplified test method, performed under operating conditions without interruption to production and at no cost.



Dustex CORP.

P.O. Box 2520 • Buffalo 25, N.Y.

52,000 Tires Worth Of EXPERIENCE!

. . . Plus The World's Finest Retreading Facilities

Superior equipment, including the world's largest and finest three-sectional retreading mold, enables Southern Tire Company to retread any tire, regardless of growth, without buffing to the breaker strips or damaging the carcass of the tire in any way!

This, plus Southern Tire's long experience and use of the finest rubber made, assures GUARANTEED NEW TIRE MILEAGE AT HALF THE COST!

CHOICE OF ROCK SERVICE, TRACTION TYPES, OR RIB TREADS TO SUIT YOUR PARTICULAR JOB.
All Sizes from 1100x24 to 2700x33.
Also new sizes 29.5x25 and 29.5x29.

NO EQUIPMENT DOWNTIME

Southern Tire's pick up and delivery service—at your job site after work hours—assures no equipment downtime.

Call Your Favorite Dealer and Specify Southern Tire Retreads.

NATIONAL TIRE DEALERS

AMERICAN ROAD BUILDERS' ASS'N 1902

SOUTHERN TIRE COMPANY

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CLOSING DATE: 20th OF THE MONTH PRECEDING DATE OF PUBLICATION.

WANTED

Equipment Maintenance Superintendent for 400 truck, 70 crawler unit fleet. Outstanding opportunity with one of the largest, most progressive companies in the midwest. Send resume of education, experience, and salaries earned. Also name of contact at your local bank.

PQ-7062, c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

PROJECT ENGINEER WANTED

Graduate Mining, Metallurgical, Chemical or Mechanical Engineer, preferably 25 to 35 years old, wanted by medium size progressive heavy machinery manufacturing company located in Southeastern Pennsylvania. To assist in design and preparing for market of various lines of equipment used in mineral dressing, heavy chemical, cement and rock products industries. Must have had engineering and field experience, and be willing to work on drafting board, travel and do field service. Opportunity also exists for a properly qualified individual, eventually to become a sales engineer. Salary open.

BOX PQ-904, c/o PIT AND QUARRY PUBLICATIONS
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MECHANICAL ENGINEER

Wanted by a large and progressive Canadian Corporation. Top-flight man, preferably with experience in the design of stone crushing and processing plants, asphalt plants, concrete plants, cement plants and conveying equipment, etc.

Must be creative and capable of producing finished designs through his own initiative and efforts that can be detailed by staff.

Interested party should forward complete resume of experience and all vital statistics, including salary required.

If applicant does not desire to disclose identity until interviewed and final negotiations are in effect, blind applications or third party submissions will be satisfactory. All information given will be held in confidence.

PQ-7052, c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

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JOHN F. MEISSNER ENGINEERS INC.
CONSULTING & DESIGNING ENGINEERS
BULK MATERIALS HANDLING
SPECIALISTS IN DESIGN OF CRUSHED STONE, SAND, GRAVEL AND READY MIX PLANTS
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J. A. Gustin & Associates
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Fluid Energy Grinding, Milling, Classification and Combustion Technology. Plant Layout, Design, Reports and Investigations, Block Plants. Serving the Lime, Cement, and Industrial Minerals Field.
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WANTED

Used rotary kilns located east of the Mississippi River.

BOX PQ-7042, c/o PIT & QUARRY PUBLICATIONS
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Quarries
Crushing Plants
Cement Plants
Storage Methods
Operating Costs

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Appraisals

FOR SALE
Gravel Plant and leases, central Iowa. New electric dredge with Swintex ladder. 3 cranes. TD14 dozer with scoop. Barber-Green loader. 2 International trucks, scales and all miscellaneous equipment for complete operation. Serves 3 ready-mix plants. A going business in best of territory.

BOX PQ-7072, c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

CORE DRILLING ANYWHERE
We look into the earth
PENNSYLVANIA DRILLING COMPANY
PITTSBURGH 20, PA.

GEOLOGIC ASSOCIATES (FIELD DIVISION)
Specialists in Subsurface Exploration
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MINING ENGINEER
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EVANS & ASSOCIATES
Consulting Engineers
A complete service for the lime, crushed stone and associated industries
Box 334
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GEOLOGIC ASSOCIATES
Engineering Geologists
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9-1519 Phones 5-4402

FOUNDATION TESTING, CHEMICAL ANALYSIS
CORE DRILLING
Thomasville Drilling & Testing Co.
THOMASVILLE, PENNA.

WANTED
CHIEF CHEMIST

Must have ability to handle all phases of cement manufacturing laboratory, mix controls, etc., and to produce all types of cement for small cement company. Practical plant operating experience a necessity and could lead to Plant Superintendent's position. Retirement income, insurance and medical coverage. State qualifications in detail, minimum salary expected.

Box PQ-7012 c/o PIT AND QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

WANTED
Gypsum Production Engineers
Cement Production Engineers

Experienced men over 35 years of age with recent knowledge of production methods, process and machines in U.S.A. to act as Engineering Assistants and Design Consultants to plant design staff of large, well-known firm of Consulting Engineers in Midwest on new American projects. Must have working knowledge of large plant process and equipment, including wet and dry process cement plants, kettle and kiln gypsum set-ups and board plants. Engineering degree not required providing experience and know-how satisfactory. Salary commensurate with background and experience. All replies treated confidentially. Give complete personal data, age, education, experience, references and salary required.

BOX PQ-6032 c/o PIT AND QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

WANTED CONVEYOR BELTING 60"

The Buncher Company
835 Shore Avenue
Pittsburgh 12, Pa.
FAirfax 1-4950

ELEVATORS
52' c/c 5x5 buckets on 6" belt.
50' c/c 8x5 buckets, complete.
32' c/c 6x4 buckets on 7" belt.
26' c/c 8x6 buckets, steel case.

PULVERIZERS—MILLS—CRUSHERS
4' x 8' Kennedy Type M Ball Mill.
7' x 36" Hardinge Conical.
6' x 8' Patterson Ball Mill.
5' x 10' Allis Chalmers Tube Mill.
8' x 10' Patterson Ball, Buhrstone.
24" x 20" Jeffrey Hammer Style B, NEW.
20" x 12" Jeffrey Hammer Style A, NEW.
15" x 8" Jeffrey Hammer Style B, NEW.
8" x 15" Pacific Jaw Crusher.

KILNS—COOLERS—DRYERS
5' x 20' x ¼" welded.
5' x 10'—Hearth Furnace.
4'6" x 40' Rotary Dryer.
310-12 Link-Belt Roto Louvre.
502-20 Link-Belt Roto Louvre.
705-20 Link-Belt Roto Louvre, SS.

SCREENS
48" 3-deck SWECO Sifter.
Tyler 5 x 12, 3 x 10 wet type.
Robinson Gyro Sifter 28A.
Gayco 5' & 18", all with motor drives.

MISCELLANEOUS
625 CFM Worth. Compressor 14x13.
8' x 10' Oliver Rotary Filter.
150 HP Union W.T. Boilers.
47' Conveyor 12" Screw, 2 HP motor.
36" x 50" Bird Cont. Centrifuge.
40" Bird Centrifuge SS susp. perf.

HEAT & POWER CO., INC.
60 East 42nd St. New York 17, N.Y.
Murray Hill 7-5280
(Machinery and Equipment Merchants)

WANTED LIME ENGINEERS

Well known manufacturer of building materials has excellent opportunity for graduate engineers with experience in lime manufacturing for an engineering position in its Chicago home office. In replying please state age, education, experience, and salary requirement.

PQ-7092, c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago, Ill.

Engineers Wanted

Mechanical, chemical, civil, electrical engineers, or chemist trained in cement plant operation wanted by large cement company. Opportunity for training and advancement. Age preferably between 23 and 35 years. Write giving complete details of education, experience, and salary expected. Confidential.

PQ-4022, c/o Pit and Quarry Publications

431 S. Dearborn St. Chicago, Ill.

WANTED
30" Gyratory Crusher
42" Gyratory Crusher
THE NATIONAL LIME & STONE CO.
Findlay, Ohio

USED EQUIPMENT LIST SENT ON REQUEST
4' std. and 5½' shorthead Symons cone crushers. 30" Superior McCully gyratory. 9'-6" x 12'. 5 x 14 & 4 x 11 ROD MILLS. BALL MILLS: Hardinge conical 8' x 48" & 8' x 36". Nordberg 9'-6" x 11'. JAW CRUSHERS: 84 x 66 Allis Chalmers, 36 x 48 Traylor, 30 x 42 Pioneer, 25 x 40 Cedar Rapids. Cedar Rapids 5050 impact breaker. 32 x 42 impact breaker portable plant. Pennsylvania hammermills SXR-100 and SXC-1358. SPIRAL CLASSIFIERS: 45", 60" and 72". APRON FEEDER 54" x 16'. LOCOMOTIVES: Sixteen—125 ton diesel electric, 45 ton G. E. diesel electric. 20 yd. std. ga. side dump cars. KILNS & DRYERS: 10 x 78, 8 x 113, 8 x 123, 10 x 130, 4 x 40. 36" BELT CONVEYORS: 584', 523' & 150'. Aggregate handling equipment including approx. 1680 ft. of 24" conveyors, feeders, etc. 400 yd. 5 aggregate compartment Octo bin with 400 barrel cement compartment, complete cement mixing plant.
Many Other Items For Mining And Construction.
STANLEY B. TROYER EQUIPMENT CO.
Box 97 Crosby, Minnesota Phone 500

FOR SALE
MARION SHOVEL
Model 490
2½ CU. YD. ELECTRIC

MATERIAL SERVICE CORPORATION
JOHN E. FITZGERALD SURPLUS EQUIPMENT DEPT.
4226 S. Lawndale Ave., Lyons, Ill., Lyons 3-4969

POSITION WANTED
Expanded Shale Supt.

or related position. Have 4½ years experience as plant supt. of large producer by rotary kiln method. Experience also in design, construction engineering, and shale exploration. Available at once.

Box PQ-7082 c/o Pit and Quarry Publications
431 S. Dearborn St. Chicago 5, Ill.

POSITION WANTED

Quarry Superintendent. Specialize in Rock excavation. Long experience in all classes of Rock. Fluent Spanish and English. Prefer warm climate. Age 55.

SAM PALUMBO
P. O. Box 10208 Santurce, Puerto Rico

WANTED TO BUY
ROTARY DRYERS
ROTARY KILNS
BALL & ROD MILLS
DIESEL LOCOMOTIVES
R. C. STANHOPE, INC.
60 E. 42nd St., New York 17, N. Y.

WANTED
¾ YD. LIMA SHOVEL
Must be late model in excellent condition.
FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l. Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

JAW CRUSHERS—6" x 3" to 60" x 48"

Before buying or selling any
FARREL-BACON JAW CRUSHERS
It will pay you to consult

BACON-PIETSCH Co., Inc.
Engineers & Manufacturers Send for Catalogue
22 Park Street Montclair, N. J.

Machine Shop Facilities
FEEDERS
Conveyors, Screens, etc.

2400 LIMA DRAGLINES & SHOVELS

2400 Lima Dragline, 120' Boom, 3—6 Yd. Buckets, Hamilton Diesel Engine

2400 Lima Dragline, 110' Boom, 2—6 Yd. Buckets, Hamilton Diesel Engine

2400 Lima High Lift Shovel, 67' Boom, 50' Stick, 4 Yd. Dipper, Cat D-397 Diesel Engine

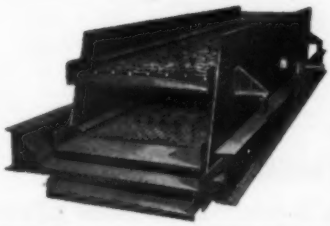
Also, Standard 6 Yd. Shovel Front Attachment for 2400 Lima and 5—½ Standard Shovel Front Attachment for 4500 Manitowoc

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton National Bank Bldg.
Hazleton, Pa.
GLadstone 5-3658

BONDED EQUIPMENT BARGAINS

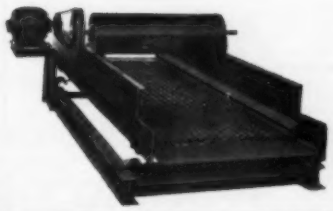
IMMEDIATE SHIPMENT FROM OUR FACTORY — WRITE, WIRE OR PHONE

NEW BONDED® HEAVY DUTY VIBRATING SCREENS



Model Number	Screening Area	No. of Decks	Sale Price
124AS	2' x 4'	1	$ 443
224AS	2' x 4'	2	472
126AS	2' x 6'	1	472
226AS	2' x 6'	2	501
136AS	3' x 6'	1	581
236AS	3' x 6'	2	688
336AS	3' x 6'	3	956
138AS	3' x 8'	1	675
238AS	3' x 8'	2	815
338AS	3' x 8'	3	996
138BS	3' x 8'	1	1231
238BS	3' x 8'	2	1282
338BS	3' x 8'	3	1375
248BS	4' x 8'	2	1865
348BS	4' x 8'	3	2035
2410BS	4' x 10'	2	1953
3410BS	4' x 10'	3	2305
3412BS	4' x 12'	3	2635

NEW BONDED® GENERAL DUTY VIBRATING SCREENS



For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry. HEAVY DUTY MODELS, TYPE BS: 4-bearing positive throw, eccentric shaft; 3' x 8' to 5' x 14', 1 to 5 decks. GENERAL DUTY SCREENS, TYPE AS: eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. Write for new 8-page Bulletins 1086 and 1087.

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2-7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	$1397	$ 722
14"	50'	2222	1144
14"	85'	3377	1733
16"	20'	1262	636
16"	45'	2137	1088
16"	60'	2662	1359
16"	90'	3712	1900
18"	25'	1477	794
18"	45'	2217	1166
18"	70'	3142	1648
18"	85'	3697	1933
18"	100'	4252	2220
18"	130'	5362	2797
20"	25'	1517	828
20"	60'	2882	1533
20"	75'	3467	1838
20"	90'	4052	2145
24"	25'	1590	898
24"	45'	2430	1330
24"	70'	3480	1875
24"	100'	4740	2514
24"	120'	5580	2950
24"	150'	6840	3603
30"	50'	2911	1617
30"	70'	3871	2119
30"	90'	4831	2614
36"	25'	1818	1118
36"	45'	2858	1678
36"	60'	3638	2096
36"	100'	5718	3214

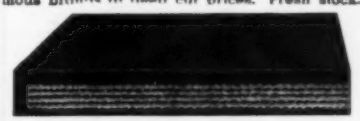
For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting.

For 14" belt	$16.84 per foot
For 16" belt	18.04 per foot
For 18" belt	19.24 per foot
For 20" belt	20.37 per foot
For 24" belt	21.78 per foot
For 30" belt	24.75 per foot
For 36" belt	27.95 per foot

Write For Bulletin #1138

NEW CONVEYOR BELTING SAVE UP TO 25%

Heavy duty 4-ply, 28 oz. duck ¼" top rubber cover by 1/32" bottom cover 12# to 15# average friction pull; 800# to 1000# average cover tensile rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.



Width	List Price	Sale Price
14"	$3.43 foot	$2.75 foot
16"	3.86 foot	2.88 foot
18"	4.27 foot	3.19 foot
20"	4.69 foot	3.69 foot
24"	5.55 foot	4.14 foot
30"	6.77 foot	5.06 foot
36"	8.01 foot	6.00 foot

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover, 16# to 19# average friction pull, 2500# to 3000# average cover tensile belting or 24# to 33# average friction pull, 2800# to 2300# average cover tensile belting. These belts are for more severe services, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belt has molded rubber edge.

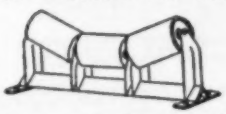
16"	4	$4.59 foot	$3.36 foot
18"	4	5.09 foot	3.72 foot
20"	4	5.57 foot	4.24 foot
24"	4	6.56 foot	4.80 foot
30"	4	8.05 foot	5.89 foot
24"	5	7.68 foot	5.61 foot

Additional widths and plies available at low prices. Write for Free Sample.

NEW BONDED ® FEEDERS

For high tonnage and controlled feed of Aggregate, Sand, Gravel, Crushed Stone, Clay products, Metallic Ores, Coal, Cinders and almost any other bulk material to Crushers, Screens, Conveyors, Mills and other process machinery. Feeder may also be driven from tail shaft of Bonded ® Troughing Idler Conveyors, thus eliminating the necessity of two motors. Capacities to 225 tons per hour. Full information in Bulletin 1140. Write for it. Priced from $255.00

NEW IDLERS AND RETURN ROLLS 25% BELOW LIST PRICE



3-roll, 5" diameter Troughing Idlers for:			
14" belt	$18.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50

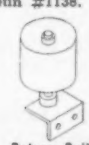
1-roll, 5" diameter Return Idlers for:			
14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable pre-lubricated Sealed ball bearings. Also can be furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Write for bulletin # 1138.

BONDED CONVEYOR ACCESSORIES

All Bonded Troughing Idler Conveyors (described in this ad) can be equipped with any accessory described below or use them on your present conveyor or bucket elevator. Write for Bulletin #1138.

Guide Idler $14.50


Return Belt Guide Idler $11.75

Wing Pulley $71.50

Holdback $99.00

Self-Aligning Idler $60.75

Head & Tail $149.00

Roll Idler $7.25

YOU ARE WELCOME TO VISIT THE BONDED FACTORY ANY TIME

BONDED SCALE AND MACHINE COMPANY

PHONE: Hickory 4-2186 Days; WRITE FOR FREE CATALOG AND PRICES PHONE: AX minster 1-2213, Evenings

110 Bellview Mfgrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders Columbus 7, Ohio

BROADCAST SECTION

BROADCAST SECTION

EQUIPMENT CORPORATION OF AMERICA

QUALITY ECA REBUILTS FOR SALE OR RENT

AIR COMPRESSOR SPECIALS

2—500 cu. ft. Ingersoll-Rand portable compressors, pneumatic tires, gas driven. Good condition ..... $3500.00 each

2—500 cu. ft. Ingersoll-Rand portable compressors, diesel driven, 4 pneu. tires ..... $4500.00 each

1—315 cu. ft. Worthington portable compressor, pneu. tires, gas engine. Excellent condition $2500.00

1—315 cu. ft. Ingersoll-Rand portable compressor, steel wheels, gas engine, good condition $995.00

1—160 cu. ft. Gardner-Denver portable compressor, steel wheels, gas engine, good condition $850.00

CRANE

1—P & H Crawler Crane, Model 255-A, serial #8243. In excellent condition. Your inspection invited. Located in our Pittsburgh Rebuilding Plant $6,750.00

DERRICKS

2—Ingram 4-ton all steel stiffleg derricks, complete with 50' boom. Capacity 4-ton @ 28' radius. Perfect condition.
3—12x28 Climax Jaw Crushers
1—10x20 Champion Jaw Crusher
1—Set 16"x10" Sturtevant Rolls
1—3' x 5' Link-Belt Shake-out Screen

Write for new Stock List No. 456

EQUIPMENT CORPORATION OF AMERICA

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PITTSBURGH 30, PA. Box P-933 FEderal 1-2900
CHICAGO 4, ILL. 327-P S. LaSalle St. WAbash 2-4661
NEW YORK 7, N. Y. 30-P Church St. WOrth 2-0036

KILNS—DRYERS—COOLERS

1—8' x 125', ⅝" shell.
4—7' x 110', 9/16" shell.
1—7'6" x 7' x 125', ½" shell.
2—6' x 74', ⅝" shell.
1—5' x 67', 5/16" shell.
1—6' x 60', 5/16" shell.
1—4'6" x 50', ⅝" shell.

CRUSHERS—PULVERIZERS—MILLS

2—Allis Chalmers 10" Superior McCully.
1—Allis Chalmers k-9 Gates Gyratory.
10—Jaw Crushers, 5" x 6" to 42" x 48".
2—Pennsylvania #SXR-100, 100 TPH.
3—Hardinge 4½' x 16", 6' x 22", 7' x 36" Ball Mills.
3—Patterson 6' x 8' Ball Mills.
1—Raymond #53 Imp Mill.
1—Dixie #2424 non-clog Hammermill.
7—NEW Jeffrey Hammermills 24" x 20", 20" x 12", 8" x 15".

SCREENS—SEPARATORS

3—Tyler Hummer Screens, 4' x 7', 4' x 8', 3' x 10', single and double deck.
1—Link Belt 3' x 8' double deck Screen.
5—Rotex 40" x 84", 40" x 120".
1—Air Separator, 4'.

MISCELLANEOUS

2—Chicago 14" x 7" Compressors, 484 cfm.
2—Oliver Rotary Dewaterers, 8' x 4'.
12—Bucket Elevators, 20' to 75' centers.
250 ft. Link Belt 12" Troughing Conveyor.
1—10,500 gpm Centrifugal Pump, 135' head.

Partial List
Your Inquiries Solicited

BRILL Equipment Company
2401 Third Ave., New York 51, N.Y.
Or
4101 San Jacinto St., Houston 4, Texas

FOR SALE OR RENTAL PURCHASE

7 HD-20 Tractors—N. Y.
Lorain 50 Shovel Attachment.
Northwest 80D Shovel Attachment.
LJSWX 13 C Y Mack Dumps.
15 & 22 Ton End Dump Euclids.
Cat D-13000, D-364, D-375 Engine.
25KW & 250 KW Generator Sets.
Maddox Single Frame Roll Crusher.
Pioneer Apron Feeder.
2—Cat D-8 w/Gardner-Denver.
600 CFM Compressors.
Dings Magnet & Magnetic Pulley.
2—Mayhew Model 1000 Drill Rigs, Truck Mounted.
Ready Mix Trucks.
Paving Equipment, Buckets, Pumps.
Light Plants, Etc.

For full information call or write

VALLEY VIEW EQUIPMENT COMPANY

Route 7, Box 497-E • Dallas, Texas • ADams 5-7134

EVENINGS AND SUNDAYS CALL

BILL BREWER—DAvis 7-5719 A. P. BEINKE—ADams 9-1654

AIR COMPRESSOR

GARDNER-DENVER 686 ft. displacement, complete with 125 h.p. F.M. 440 3 ph. 60. elec. motor. on steel skids and with 500 gal air receiver.

ARROW CONTRACTORS
4646 S. Kedzie Ave.
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FRontier 6-6500

NEW—RAILS—RELAYING

Track Accessories
All prices cheerfully quoted.

M. K. FRANK

480 Lexington Avenue - New York City
Park Bldg., Fifth Avenue - Pittsburgh, Penna.
105 Lake Street, Reno, Nevada

USED CRUSHING & MINING EQUIPMENT

18" x 24" Gruendler roller Brng double roll crusher, one smooth one corrugated roll shell, bucket elevator all mounted on common frame with 4-steel wheels, 3-Jackleg steel bins, Revolving screen. This machine is in excellent condition throughout. Priced at only $2850.00, f.o.b. Cars as listed above, located Franklin, N. C. 10-B, Telesmith gyratory in excellent condition, only $2500.00.

20" x 36" Cedar-Rapids roller Brng jaw, 25" x 40" Cedar-Rapids roller Brng Jaw.

Charles A. Constance & Sons
Box 2222 Asheville, N. C.
Phone 3-3968

FOR SALE

PULVERIZERS—Jeffrey 42 x 24 type B, and S-6 Pennsylvania Hammermills.

COLLECTORS—Ducon, one wet and one dry filter.

SCREEN—Robins 4' x 6½' Dble Deck Gyrex.

CLASSIFIER—Dorr 26' bowl with 5 x 30' rakes.

G. & W. H. Corson, Inc.
Plymouth Meeting, Pa.

CHEAP DIRT MOVING

4 Woolridge Terra Cobras, Excellent Condition. Have been rebuilt to go to work, rubber excellent on two, 70% on one, 50 to 75% on the other; 24:00 x 25 tires. These units are approximately 4 years old; serial nos. TC 34105, 34211, 34212, 34213, equipped with S-142 Scrapers. $4000.00 to $5000.00 worth of extra parts including a transmission, axles, drive chains, sprockets, etc. Located at Wright Contracting Company's yard at Odenton, Maryland. Will accept any reasonable offer.

EUCLID-TENNESSEE, INC.
Box 1176
720 Murfreesboro Road
Nashville, Tennessee
Tel. ALpine 6-1648

FOR SALE

SECOND-HAND 2-FOOT SYMONS CONE CRUSHER. EXCELLENT CONDITION. F.O.B. RAILROAD CARS, PHILMONT, NEW YORK.

Catskill Mountain Stone Corp.
50 Haarlem Avenue • White Plains, N. Y.

SURPLUS EQUIPMENT FOR SALE

In order to balance our equipment inventory, we are disposing of over 75 units including:

SHOVELS - DRAGLINES
CRANES
CONCRETE & PAVING EQUIPMENT
COMPRESSORS - BULLDOZERS
LOADERS - TRUCKS - TRAILERS
AND MANY OTHER ITEMS

most equipment used on one job only
LOCATED IN PHOENIX, ARIZ. AND ALMA, COLO.

WRITE, PHONE OR WIRE FOR A COMPLETE LIST

FISHER CONTRACTING CO.
Attn: Jack E. Brown—Surplus Equipment Sales
Phoenix, Arizona
P.O. Box 6306 Phone: ALpine 8-7741

OVERHEAD ELECTRIC TRAVELING CRANES: 5 to 50 tons capacity, 20 ft. to 95 ft. span, A.C. and D.C.

DORR CLASSIFIER AND WASHER: 12′ x 30′ x 2½′ quarduplex wood tank, with 20 H.P. motor. Condition excellent.

DORR TROMMEL: 5′ to 6′ dia., 10′6″ long, with motor.

FLOTATION EQUIPMENT complete including pulp sampler and distributor, mineral jigs, 6 cell flotation machines, super charger, agitator, 4″ concentrate pumps, reagent distributors, etc. Used only 300 hrs.

FEEDER: Robins heavy duty, manganese steel, Oro Rock Feeder 60″ x 14 ft. with 20 H.P. motor, reducer, etc. New condition.

PAN CONVEYOR: 48″ x 110 ft. complete with motor, reducer, etc., heavy duty type, designed for rock.

BALL MILLS: 9′6″ x 11 ft., NEW. Two Allis Chalmers 5 ft. x 22 ft. Tube Mills with steel heads.

ROD MILLS: 2—Marcy Open End size 5′ x 14′.

DRYERS: 2—Heavy duty 9′ x 70′ with all equipment, new condition.

JAW CRUSHERS: 10 x 20, 15 x 36, 18 x 30, 24 x 36, 30 x 42, 42 x 40, 48 x 60, with or without motors.

LOCOMOTIVE CRANE: 25 ton capacity, standard gauge, gasoline powered, cast steel trucks, air brakes, with or without 1¾ yd. Williams clam shell bucket, thoroughly modern, excellent condition. Located Minnesota. For sale or rent.

MINE HOISTS: Single and double drum 100 to 1500 H.P., with all electrical equipment. Complete specifications, drawings, photos available.

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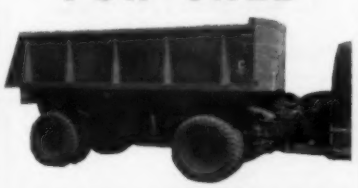

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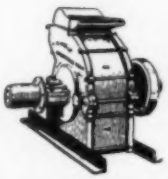

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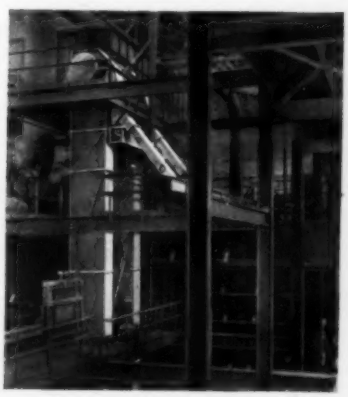

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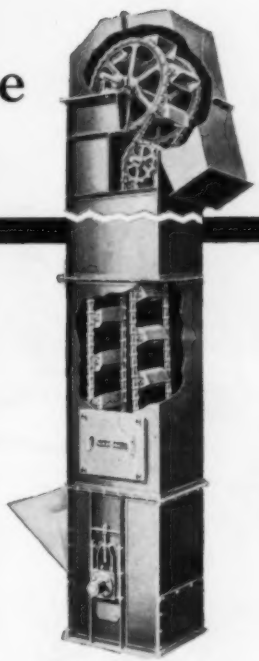

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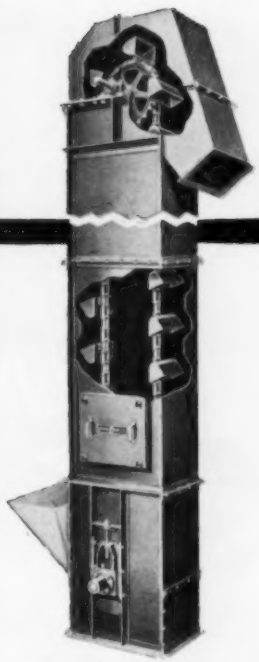

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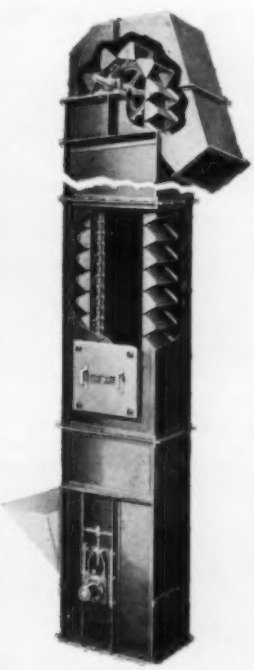

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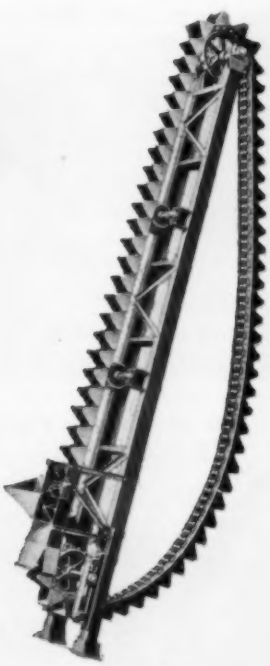

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INDEX TO ADVERTISERS

A

A A Wire Products Co. 288
Ajax Flexible Coupling Co., Inc. 362
*Allis-Chalmers Mfg. Co. 13, 76-77, 262
*Allis-Chalmers Mfg. Co., Buda Division 239
*Allis-Chalmers Mfg. Co., Construction Machinery Division 385
American Brake Shoe Co. 258
American Chain & Cable Co., Inc. 55, 232
American Clay Machinery Div. of Huber-Warco Co. 298
American Cyanamid Co. 231
*American Manganese Steel Div. American Brake Shoe Co. 269, 386
*American Pulverizer Co. 218
American Road Builders' Assn. 270
*American Steel & Wire Div., U. S. Steel Corp. 28-29
Andrews Machine Co. 290
Armstrong-Bray Co. 384
Armstrong-Delay, Inc. 372
Austin-Western Co. 375
Automotive & Aircraft Division, American Chain & Cable Co., Inc. 232

B

*Babcock & Wilcox Co. 106-107, 254
*Bailey Meter Co. 152-153
Baldwin-Lima-Hamilton Corp. Construction-Equipment Div. 217, 375
*Barber-Greene Co. 120
Bay City Shovels 248
*Bergen Machine & Tool Co., Inc. 309
*Besser Co. 276, 289, 316, 327, 349
*Bethlehem Steel Co. 377
*Bin-Dicator Co. 278
Bonded Scale & Machine Co. 367
Bradley Pulverizer Co. 151
Brill Equipment Co. 368
Broadcast Section 365-372
*Brunner & Lay, Inc. 48
Bucyrus-Erie Company 63
*Buda Division, Allis-Chalmers Mfg. Co. 239
*Buell Engineering Co., Inc. 110-111
Buncher Co. 369
*Butler Bin Co. 338

C

C & W Sales Co. 284
Calumet Division 47
Cambridge Instrument Co., Inc. 378
Carlyle Rubber Co., Inc. 371
Carpenter Manufacturing Co. 341
Carter-Waters Corp. 332, 333
Caterpillar Tractor Co. 21, 177, 201
Chase Bag Co. 30

*See also Detailed Information in 1956 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK

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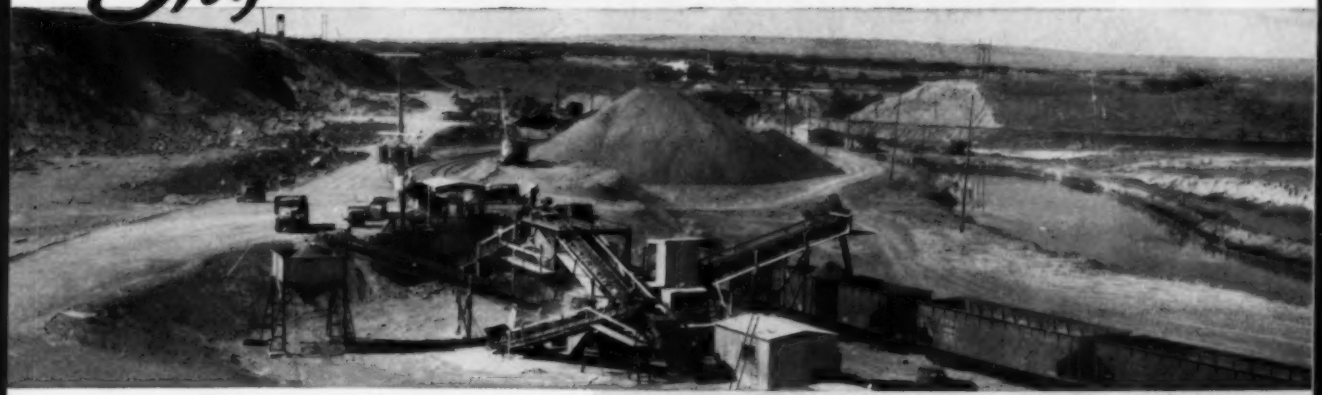

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Chase Foundry & Mfg. Co. 337
Chicago Pneumatic Tool Co. 22
Cinder Shippers 347
Cities Service Oil Co. 57
Cleaver-Brooks Co. 273
Cleveland Vibrator Co. 148
Cleveland Worm & Gear Co. ..... Inside Back Cover
*Colorado Fuel & Iron Corp. 210, 251
Columbia Machine Works 287
*Combustion Engineering, Inc. Raymond Division 132-133
Concrete Controls Co. 280
Concrete Machinery Co., Inc. 341
Concrete Manufacturer Classified Section 345-347
*Construction Machinery Co. 352
Continental Boiler & Sheet Iron Works 146
*Continental Gin Co. 257
Conveyor Company 382
Cook Bros. Equipment Co. 285
Cook & Ingle Concrete Products Co. 351

D

Darden Industries, Inc., Roy 341
Day Company 156
*Deister Concentrator Co. 58
*Deister Machine Co. 9
Des Moines Glove & Mfg. Co. 349
Detroit Diesel Engine Div., General Motors Corp. 34-35
Dewey & Almy Chemical Co. 142-143
*Diamond Iron Works, Inc. 7
*Dorr-Oliver, Inc. 159
Drott Mfg. Corp. 253
Dunn Mfg. Co., W. E. 339
Du Pont de Nemours & Co., Inc., E. I. 267
Dur-O-wal 343
Dustex Corporation 364

E

*Eagle Crusher Co. 51
*Eagle Iron Works 25
Easton Car & Construction Co. 67
Eaton Mfg. Co. 6
Edick Laboratories 325
Eighmy Equipment Co. 369
Eimco Corporation 173
Elastizell Corp. of America 279
Ensign-Bickford Co. 207
Ensign Electric & Mfg. Co. 163
Equipment Corp. of America 368
Erickson Power Lift Trucks, Inc. 337
*Erie Strayer Co. 356
Euclid Division, General Motors Corp. 37

F

Fairbanks, Morse & Co. 61
*Falk Corporation 105
Farrell-Cheek Steel Co. 234
Fate-Root-Heath Co. 360
Fiske Brothers Refining Co., Lubriplate Division 33
*Fleming Mfg. Co. 328
Food Machinery & Chemical Corp. 321

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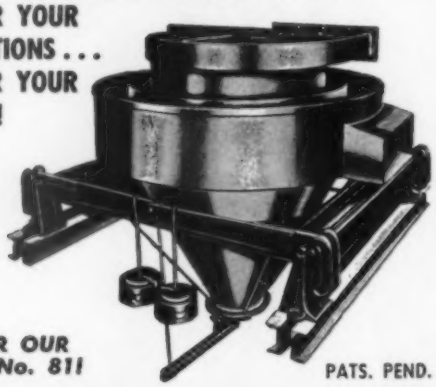

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Ford Motor Co. 44-45
Forney's Inc. 324
Frank, M. K. 368
*Frederick Iron & Steel, Inc. 382
Frog, Switch & Mfg. Co. 54
*Fuller Co. 80-81

G

Gar Wood Industries, Inc. 252
Gates Rubber Co. 256
General Cable Corp. 155
General Engines Co., Inc. 346
General Motors Corp. 34-35, 37
*General Refractories Co. 83
General Tire & Rubber Co. 225
Giffels & Vallet, Inc. 169
Gilson Screen Co. 56
GO Corp. 357
Goodyear Tire & Rubber Co. 1
Gorman-Rupp Co. 26
*Gruendler Crusher & Pulverizer Co. 140
Gulf Oil Corp. 243
Gwynne, Inc., J. H. 343

H

H & L Tooth Company 227
Hannon & Sons, F. R. 380
*Harbison-Walker Refractories Co. 41
*Hardinge Company, Inc. 166
Hazard Wire Rope Division, American Chain & Cable Co., Inc. 55
Heat & Power Co. 366
Heidenreich, E. Lee, Jr. 365
Heineken, Inc., W. P. 167, 371
Heltzel Steel Form & Iron Co. 331
*Hendrick Mfg. Co. 383
Hendrix Mfg. Co. 249
*Hercules Motors Corp. 226
Hetherington & Berner, Inc. 384
*Hewitt-Robins, Inc. 124-125
Hoffmann Co., Geo. W. 346
Holiday Hill of America, Inc. 313
Hough Co., Frank G. 190-191
Huber-Warco Co., American Clay Machinery Division 293
*Hyster Co. 355

I

Industrial Brownhoist Corp. 59
*Ingersoll-Rand Co. 157
International Harvester Co., Industrial Power Div. 18-19, 213, 237, 253
International Harvester Co., Motor Trucks 266
International Nickel Co. 90-91
International Paper Co. Bagpak Division ..... Inside Front Cover
*Iowa Manufacturing Co. 139

J

Jaeger Machine Co. 294-295
Jeffrey Mfg. Co. 8

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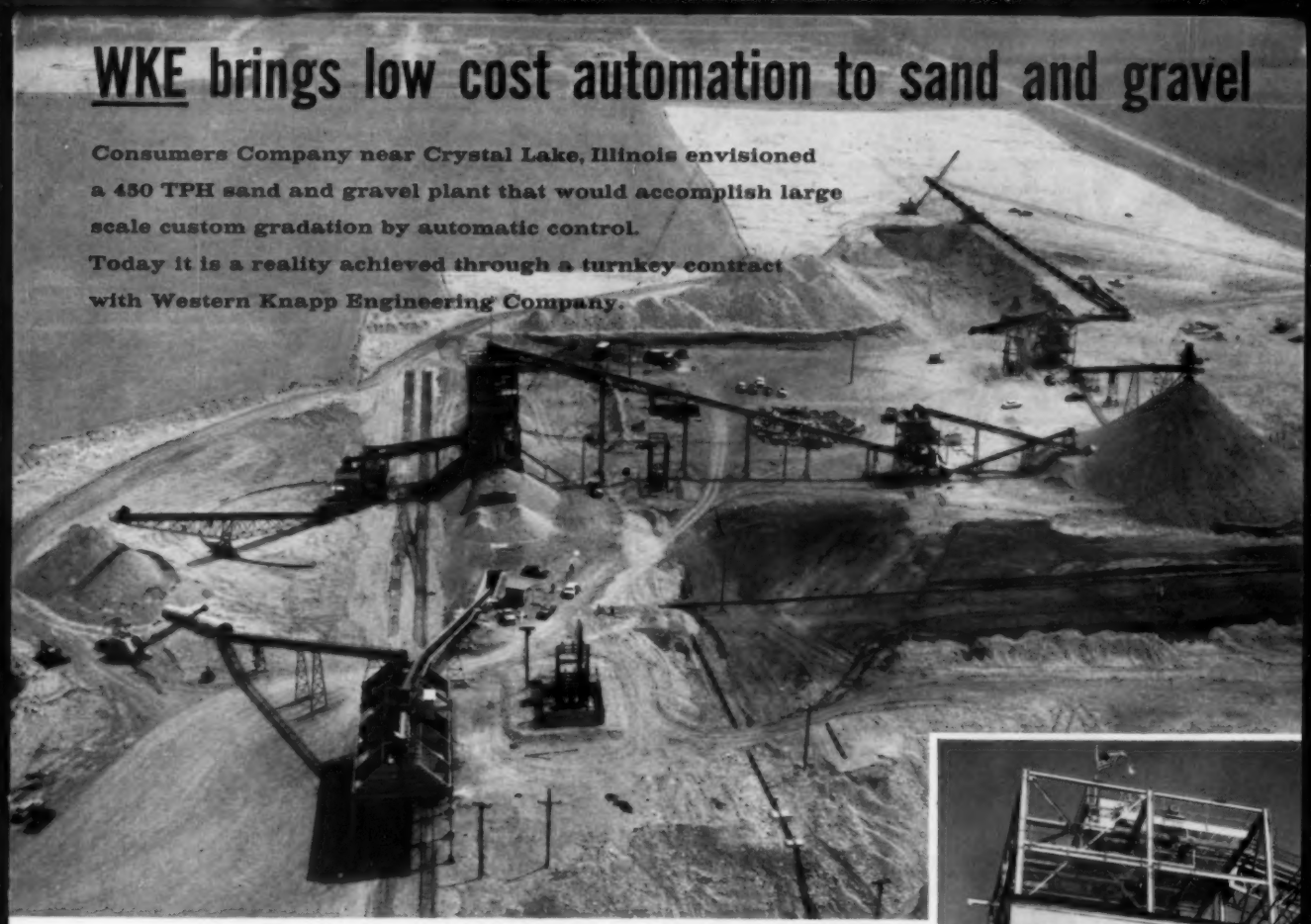
WKE brings low cost automation to sand and gravel

Consumers Company near Crystal Lake, Illinois envisioned a 450 TPH sand and gravel plant that would accomplish large scale custom gradation by automatic control. Today it is a reality achieved through a turnkey contract with Western Knapp Engineering Company.



The Consumers' plant was designed for greatest economy of operation with maximum flexibility and speed. **(A 12 yard truck can be loaded in 6 seconds . . . a 70 ton gondola in less than 60 seconds.)** One man at a push-button console station in the main screening structure controls and coordinates every operation from raw storage pile to finished product.

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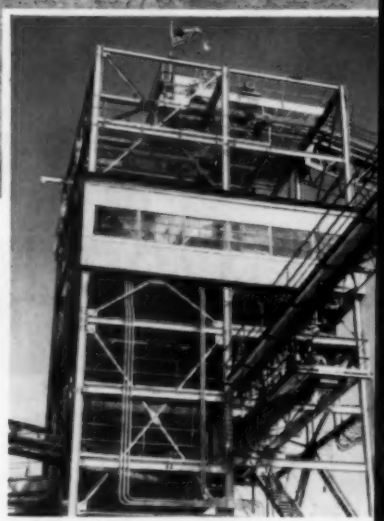

All operations can be seen and controlled from this screening tower. Below ground vibrating feeders are automatically controlled to blend desired percentages from six graded storage piles.

A detailed report on this outstanding plant is available upon request.

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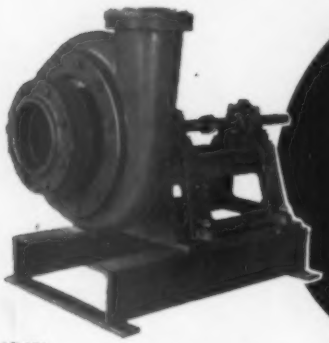

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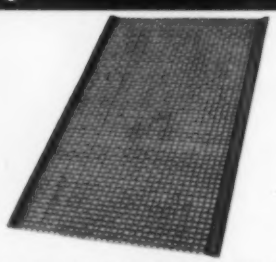

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*Johnson-March Corp. 162
*Joy Manufacturing Co. 376, 384

K

Kaiser Aluminum & Chemical Corp. 241
Kansas City Hay Press Co. 380
*Kennedy-Van Saun Mfg. & Engrg. Corp. 68-69, 164-165
Kensington Steel Co. 141
Kent Machine Co. 281
Koehring Co. 246-247
Koppers Co., Inc. 170
*Kraft Bag Corp. ..... Back Cover

L

Laclede-Christy Company, Div. of H. K. Porter Company, Inc. 137
LeTourneau-Westinghouse Co. 359, 361, 363
*Link-Belt Company 3, 373
*Link-Belt Speeder Corp. 53
*Lippmann Engineering Works 95
Lone Star Cement Corp. 272
Lubrecht III, William 369
Lubriplate Division, Fiske Bros. Refining Co. 33

M

MacDonald Engineering Co. 113
Marsh Engineering Co., E. F. 340
Martin Engineering Co. 343
*McLanahan & Stone Corp. 117
McNally Pittsburgh Mfg. Corp. 49
Memphis Equipment Co. 56
*Merrick Scale Mfg. Co. 122
Midvale-Heppenstall Co. 221
Mine & Smelter Supply Co. 212
Moline Malleable Iron Co. 245
Monarch Road Machinery Co. 339
*Morris Machine Works 214
Murphy Diesel Co. 244

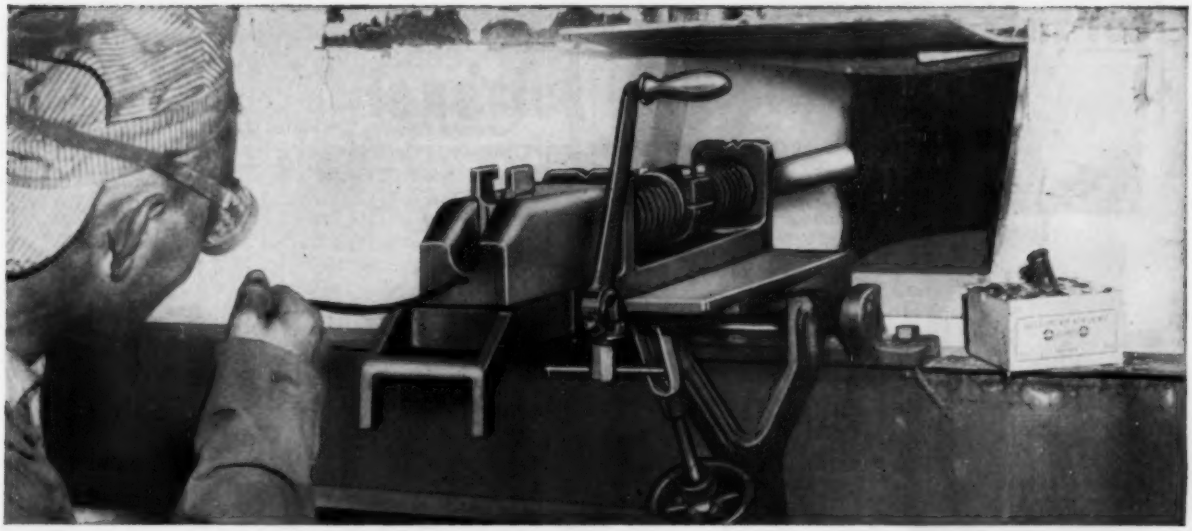
N

National Conveyor & Supply Co. 335
National Wire Cloth Co. 349
*Naylor Pipe Co. 238
Neff & Fry Co. 211
New York Engineering Co. 27
New York Trap Rock Corp. 372
Noble Company 274
*Nordberg Manufacturing Co. 86-87
Norfolk & Western Railway 150
*Northern Blower Company 158
Northwest Engineering Co. 101

O

Olsen Corp., Gene 357
O'Neill, A. J. 369
Oswalt Engineering Service Corp. 337
Owen Bucket Co. 229

*See also Detailed Information in 1956 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK



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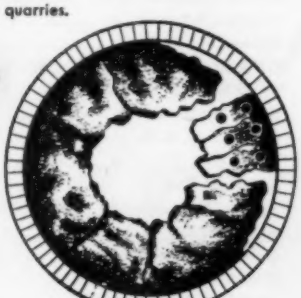

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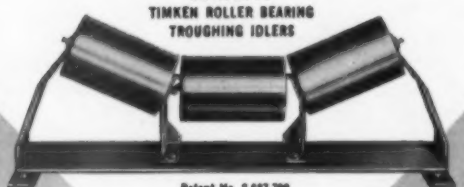

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P

*Page Engineering Co. 259
Patterson Foundry & Machine Co. 199
Penn-Dixie Cement Corp. 283
Pennebacker Company 144
*Pennsylvania Crusher Div., Bath Iron Works Corp. 204
Pennsylvania Drilling Co. 365
Percy Kent Bag Co., Inc. 140
*Pettibone Mulliken Corp. 255
Philadelphia Gear Works, Inc. 261
Phillips Co., The Thomas 264
*Pioneer Engineering Works, Inc. 147
Porter Company, Inc., H. K. 137
Portland Cement Assn. 350
PreCaster, Inc. 282
Preco, Inc. 219
Punch-Lok Co. 374

Q

Quinn Wire & Iron Works 330

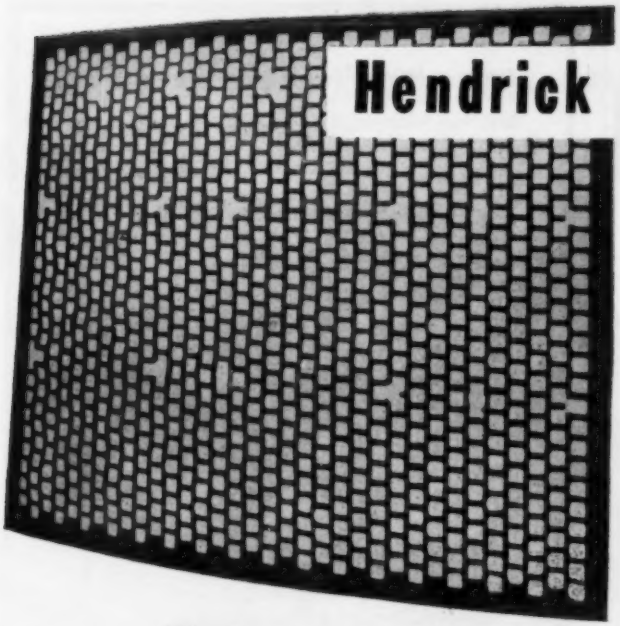
R

Radio Corporation of America 301
*Raymond Bag Co. 161
*Raymond Division, Combustion Engineering, Inc. 132-133
Reichard-Coulston, Inc. 316
Remington Arms Co., Inc. 381
Reo Motors, Inc. 16-17
*Research-Cottrell, Inc. 84-85
Richmond Fireproof Door Co. 323
Roebling's Sons Corp., J. A. 20
*Rogers Iron Works Co. 233

S

St. Regis Paper Co. 14-15
Salem Tool Co. 228
Sarasota Engineering Co., Inc. 351
Sauerman Brothers, Inc. 260
Schaffer Poidometer Co. 74
Schield Bantam Co. 326
*Scientific Concrete Service Corp. 344
Sheffield Steel Corp. 263
Side-O-Matic Unloader Corp. 339
*Simplicity Engineering Co. 222-223
Simpson Co., Orville 138
Sinclair Refining Co. 208
Sitton Co., Philip 307
Sly Mfg. Co., W. W. 154
*Smidth & Co., F. L. 65, 172
Smith Engineering Works 31
Smith, Inc., L. B. 372
*Smith Co., T. L. 329
Southern Tire Co. 364
Spang & Company 216
Spillman Co., R. L. 347
Sprague & Henwood, Inc. 235
Standard Dry Kiln Co. 351
Standard Metal Mfg. Co. 362

*See also Detailed Information in 1956 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK



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*Stearns Manufacturing Co., Inc. 358
*Stephens-Adamson Mfg. Co. 240
Stoody Co. 5
Straub Mfg. Co. 215
*Sturtevant Mill Co. 265
Superior Pneumatic & Manufacturing, Inc. 345
Surety Rubber Co. 323
Swabb Equipment Co., Inc., Frank 366, 370
*Syntron Co. 236

T

Taylor-Wharton Iron & Steel Co. 64
Texaloy Foundry Co. 347
Texas Company 11
*Thor Power Tool Co. 145
Timken-Detroit Axle Div. 182-183
Tool Steel Gear & Pinion Co. 118-119
Torrington Company 123
*Traylor Engrg. & Mfg. Co. 196-197
Treadwell Engineering Co. 151
Trinity Div., General Portland Cement Co. 323
Truck-Man Division, Knickerbocker Co. 348
*Twin City Iron & Wire Co. 341
Twin Disc Clutch Co. 242
*Tyler Co., W. S. 224

U

Union Wire Rope Corp. 38-39
Unit Step Form Co. 342
United States Rubber Co. 42-43, 129
*United States Steel Co. 28-29, 202-203
*Universal Engineering Corp. 255
Universal Road Machinery Co. 168
*Universal Vibrating Screen Co. 54
Unverzagt & Sons, G. A. 370

V

Valley View Equipment Co. 368
Victor Equipment Co. 250
Virginia Gear & Machine Corp. 261

W

Wenzel Machinery Co. 371
*Werco Steel Co. 100
Western Machinery Co. 379
*Western Precipitation Corp. 96
*Wickwire Spencer Steel Div.
Colorado Fuel & Iron Corp. 210
Wilfley & Sons, Inc., A. R. 66
*Williams Patent Crusher & Pulverizer Co. 171
Williams, Roger F. 341
Wire Rope Corp. of America 4
*Wood Co., Chas. E. 378
Worthington Corp. 314-315

Y

*Yuba Manufacturing Co. 230

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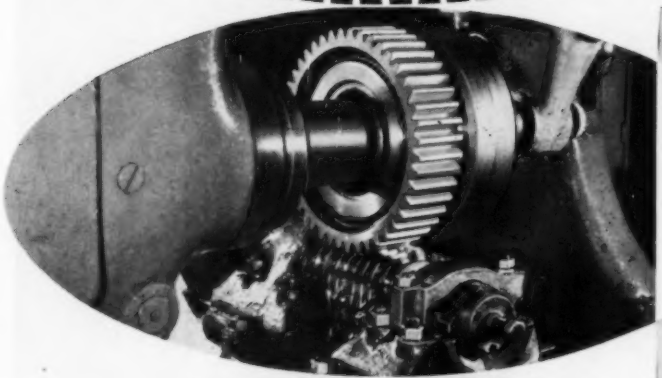

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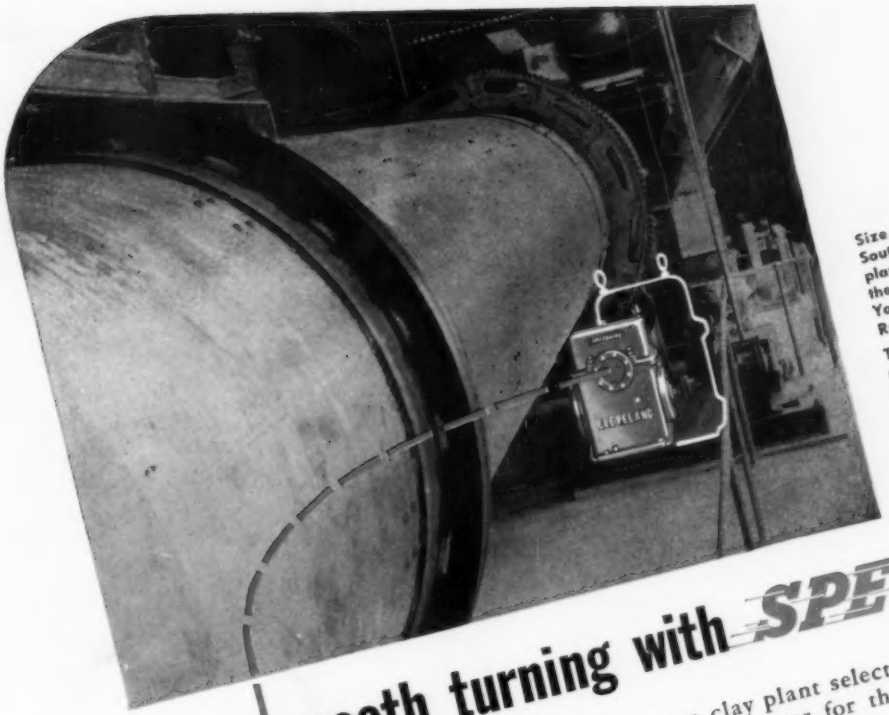

Size 500FA Speedaire in a South Carolina clay products plant. Photo by courtesy of the Hardinge Company, Inc., York, Pa., builder of the Ruggles-Coles dryer.

The white outline on the photograph indicates the much larger size of conventional drive required to do the work of Speedaire.

It's always smooth turning with SPEEDAIRE

THE manager of a southern clay plant selected Speedaire to drive this rotary dryer for three good reasons—

1. The fan-cooled Speedaire worm gear reducer always runs cool and smoothly under heavy loads, unaffected by heat, moisture, dust and grime.

2. Because of its smaller frame size, he was able to use Speedaire to effect a closer hook-up between the dryer shell and the motor. As this photograph shows, space is at a premium here.

3. Speedaire saved him $733 over the cost of a conventional drive of equivalent capacity.

Speedaire is built especially for tough jobs like this. Scores of units, large and small, are in service in the rock products industries. If you aren't familiar with Speedaire, and want to save headaches and money when you buy your next speed reducer, call on us. Just write and ask for a copy of Catalog 300. The Cleveland Worm and Gear Co., 3280 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication.
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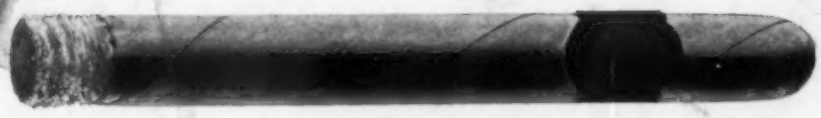
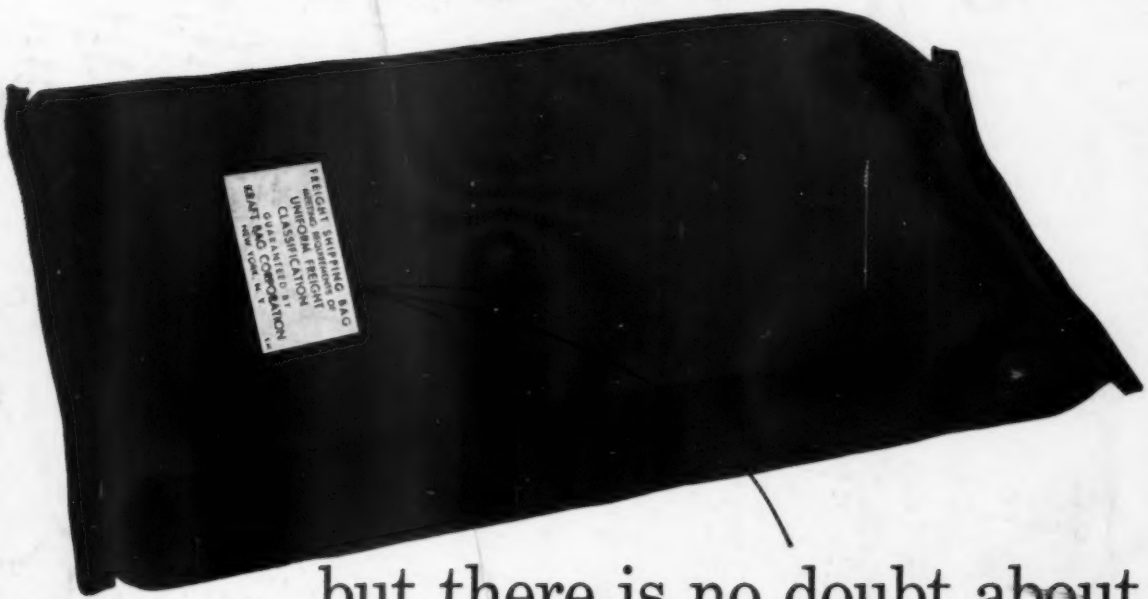
Cigars and Multiwall Bags



Kraft Bag Corporation, as a manufacturer of multiwall bags, is in the same position as the cigar manufacturer who complained that everything to be said about his 25c cigars had already been said about 5-centers!



...but there is no doubt about the quality of the multiwall bags that bear the Kraft Bag Corporation stamp!

Our completely integrated plants and modern facilities producing every type of heavy-duty valve or open mouth bag, are second to none!

As an exponent of true specialization, there isn't a single known or desirable time-and-labor-saving development that we haven't already either considered, initiated, adopted or built into multiwall bags we are called upon to make for America's industries, while continuing our search for still better ways to package our customers' products.

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